The Builder.

VOL. LV. No. 2384. SATURDAY, OCTOBER 13, 1888.

ILLUSTRATIONS.

House, near Upton-on-Severn.—Mr. C. E. Mallows, Architect ..... *Double-Page Photo-Litho.*
Great Indian Peninsular Railway Terminus, Bombay.—Mr. F. W. Stevens, Architect ..... *Double-Page Photo-Litho.*
View of Central Portion of the same Terminus ..... *Single-Page-Ink-Photo.*
Principal Dome of the same ..... *Single-Page Ink-Photo.*
Carriage Porch and Principal Entrance of the same ..... *Two Single-Page Ink-Photo's.*

Blocks in Text.

Strata Florida Abbey: Plan, and Sections of Arches, &c. ..... *Page* 260
Tombstones from the Peterborough District.—From Drawings by Mr. J. T. Irvine 268
Plan of the Great Indian Peninsular Railway Terminal Buildings, Bombay 269

CONTENTS.

Excavations at Strata Florida 259
Notes on Sacristies 261
Notes 262
Italian Renaissance Vase 265
Inventions, and How to Patent Them 266
The New River and a Seventeenth-Century "Promoter" 267
Heston and Isleworth Main Sewerage 267
Tombstones near Peterborough 268
House on the Severn 268
Great Indian Peninsular Railway Terminal Buildings, Bombay 268
The Opening *Conversazione* of the Architectural Association .. 270
The Leland Club 270
Extension of Waterworks, Aberdeen 271
The "National Standard" Theatre in the Auction Mart 271
Light Railways 271
Obituary 272
The Auctioneers' Benevolent Fund 272
A Novel Light and Air Case 272
Action for Professional Fees 273
Competitions Committee, Royal Institute of British Architects 273
The Mildmay Tomb in St. Mary's Church, Chelmsford 273
Sugar in Mortar 273
The Student's Column: Artificial Stones.—XV. 273
Recent Patents 273
Recent Sales of Property 274
Miscellanea 274

Excavations at Strata Florida.

IN the wildest district of "wild Wales," four miles from Strata Florida station, on the Manchester and Milford Railway, stood the once famous Church of Ystrad Flur or Strata Florida, the Westminster Abbey of Wales. Founded in the year 1164 by Rhys ap Gruffyd, Prince of South Wales (he whom the English called "the Lord Rees"), it was destroyed by lightning during the wars of King Edward I., but so important did this centre of civilisation appear to the conqueror of Wales that he granted a sum of 78*l.* towards the re-edification of the Abbey. In 1402, when Owain Glyndwr was in arms against the English, Henry, Prince of Wales, afterwards Henry V., occupied the building with 600 archers and 120 men-at-arms. About the year 1535, Leland visited Ystrad Flur. He notes down that "the Church of Strate flur is large, side ilid, and cross ilid. By is a large cloyster; the fratri and infirmation be now mere ruines; the coematori, wherein the counteri about doth buri, is very larg, and meanly waulled with stone, in it be 39 great hue trees, the base court or camp before the abbey is very faire and larg."

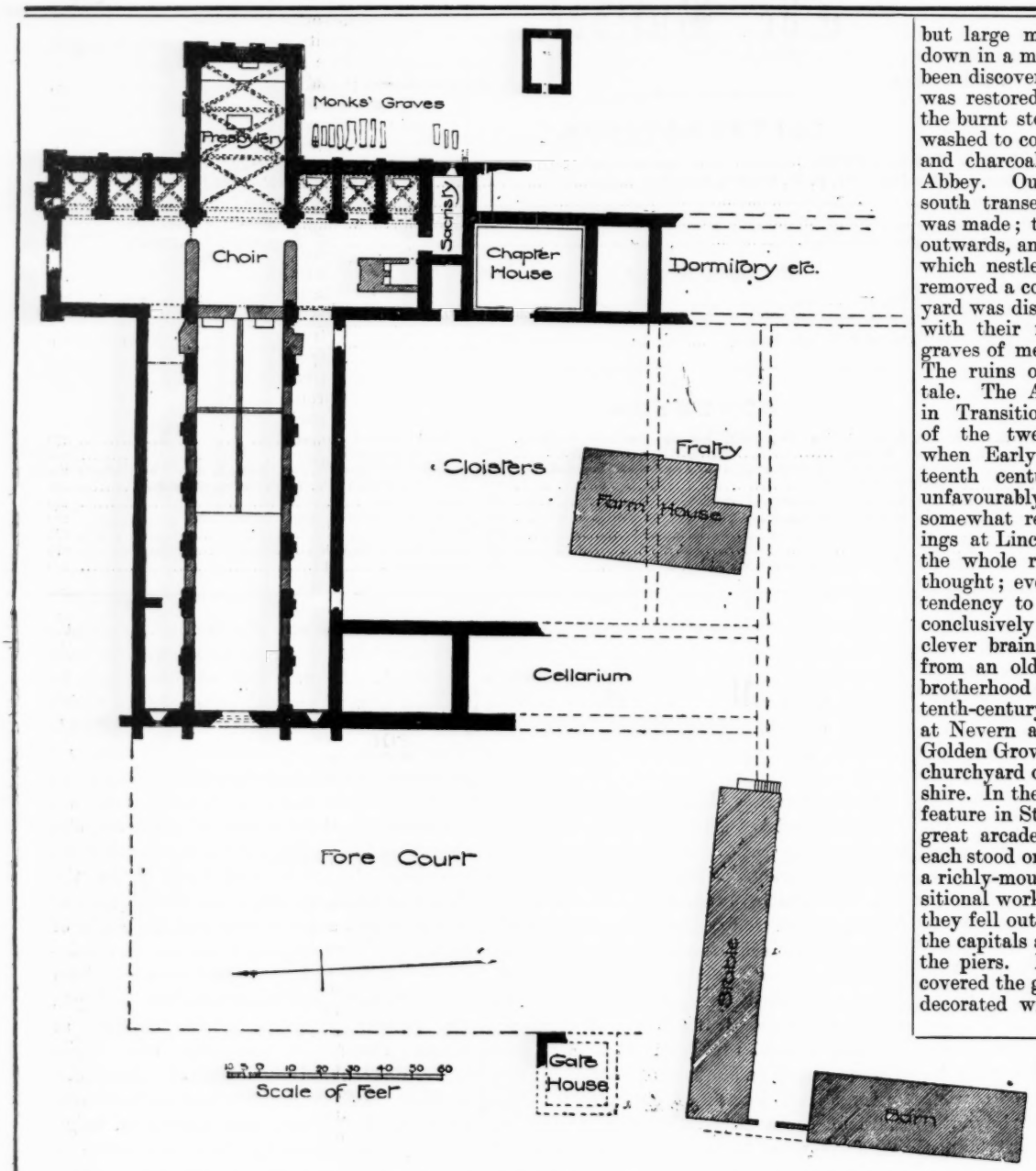
The revenue of this foundation at the time of the dissolution was estimated at 122*l.* 6s. 8d. It fell into the hands of the Stedman family, who erected a mansion hard by.

Buck gives a view of the ruins in 1741, and depicts (besides the Norman west door which still exists) a portion of the south transept, with the great arch belonging thereto. He omits, oddly enough, a piece of wall representing the western angle of the north transept, which was standing last year, but has since fallen. For four centuries this Cistercian monastery was the burial-place of Welsh worthies, and during that period the inmates of Strata Florida were engaged in compiling the history of Wales. Here were probably written both the "Annales Cambriæ" and the "History of the Princes." Strata Florida should, indeed, be holy ground to every patriotic Welshman. Until the other day, all we knew of the plan was gleaned from Leland's notes; concerning the details of the structure we were in absolute ignorance. Now, thanks to the indomitable energy of Mr. Stephen Williams, F.R.I.B.A., we actually know more about this buried abbey of the Cistercian monks than we can glean concerning the architectural details of many a village church, which, though never dismantled, has passed through the restorer's hands.

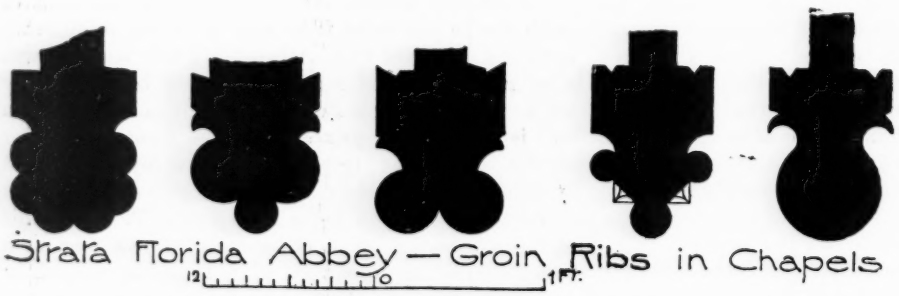
At the Swansea Congress of the Cambrian Archæological Association, in 1886, the society voted a small grant towards exploring the ruins of Strata Florida. Work was commenced by Mr. Williams in June, 1887. A few weeks' digging proved that we have here the site of a very important ecclesiastical building, of which the dimensions were as follows:—Total length, 213 ft.; length of nave, 132 ft. 6 in.; width of nave and aisles, 61 ft.; length of transepts, including central tower, 117 ft. 3 in.; width of transepts, 28 ft.; square of lantern central tower, 28 ft.; length of choir, 52 ft. 6 in.; width of choir, 28 ft. Above ground we had a fragment of the west wall, in which was the west doorway, and the west window of the south aisle. The former is a very fine piece of work, and fortunately well preserved. It consists of a semicircular arch, with five shafts carried round the arch unbroken, terminating on the wall face in a rich ornamentation, the device somewhat resembling a crosier. The window is a Transitional Norman light, recessed for a shutter, and apparently not originally glazed. Mr. Williams commenced operations on the threshold of the western door, and, having removed 3 ft. of rubbish, arrived at the floor level. From this spot he worked eastward, gradually disclosing the plan of the building, and bringing to light an invaluable collection of carved details. About half of the nave and the north and south aisles have been absolutely cleared, together with the whole of the north transept and its three eastern chapels, half of the presbytery, the exterior of the north transept, the east end of the presbytery, the east side of the south transept and chapter-house; here were great freestone plinths and fine buttresses, showing that in all probability the entire building once had fine-dressed freestone quoins throughout. Mr. Williams thinks that the neighbours greedily stole these said quoins for building purposes, and thus brought about the destruction of the abbey. It is not impossible that the country folks also robbed the ruins of its freestone, to grind up into sand for cleaning their wooden platters. This certainly was done in other parts of Wales. A notable feature in Strata Florida must have been the contrast between the coarse rubble walling* and the beautifully-artistic carved details set therein like jewels in rude pinchbeck. A great deal of history may be gleaned from the actual material from which this church was constructed. The rubble work is built up of a local Cambrian stone, set in mortar of the worst description, lime being evidently scarce and dear; which proves that the builders had not command of the sea, else they would have shipped the fine South Pembrokeshire limestone and burnt it on the shores of Cardigan Bay; but the Princes of South Wales were at war with the Earls of Pembroke, so this could not be, and limestone was laboriously carried overland from some other source (Carmarthenshire, perhaps). The mortar employed in the building at Strata Florida is execrably bad, while that used by the lords of Pembroke in their various military and ecclesiastical works is of the very best descripton, being actually more enduring than the stone it binds. At Strata Florida we find a small portion of the inside walling (more especially the western arch of the tower) was built of a grit stone from coal measures, presumably those of Carmarthenshire; this material was scarce and ran out, its place being taken by oolite from Bath. Mr. Williams felt certain that the grit stones came from some older building (perhaps the Hen Mynach or Old Abbey, whose foundations may still be traced about two miles from Strata Florida); this impression of the excavators was confirmed by the discovery of a moulding carved in grit, and built into the main wall of the abbey.

This fragment had not only been carved, but coloured in fresco before it was embedded in the wall. How Bath stone got into Mid-Cardigan is somewhat of a mystery,—probably by sea, and most likely in Bristol ships, which either obtained a permit from the Earl of Pembroke, or braved his anger. It is likely that these same ships brought some yellow sandstone from the New Red Formation, which is sparingly used in the Abbey. Perhaps this beautiful material comes from the shores of the Bristol Channel. The arches and capitals seem to have been banded with a ribbing of the purple stone from Caer Fai quarries, near St. David's, a material probably obtained without much difficulty. Dug within a few hours' sail of the Cardiganshire shore, no political difficulties would stop the way, for the episcopal Lord of Dewisland subordi-

* Very likely this was plastered, but as lime was a rarity in Cardiganshire we cannot be sure.



Plan of Strata Florida Abbey.



but large masses of lead, which have run down in a molten stream from the roof, have been discovered. It is clear that the Abbey was restored after the fire, for we find that the burnt stones were re-trimmed and lime-washed to conceal their scars, while the lead and charcoal underlies the flooring of the Abbey. Outside the eastern wall of the south transept a most interesting discovery was made; the wall at this point had fallen outwards, and in its ruin buried the graves which nestled beneath; when the *débris* was removed a corner of a twelfth-century churchyard was disclosed, the head and foot stones, with their rude crosses, still marking the graves of men who died seven centuries ago. The ruins of Strata Florida tell their own tale. The Abbey was evidently commenced in Transitional Norman times (latter half of the twelfth century), and completed when Early English was in vogue (thirteenth century). Its details compare not unfavourably with the best English work, somewhat resembling in character the carvings at Lincoln and St. David's, but through the whole runs a distinctly Keltic train of thought; every pattern has more or less a tendency to interlaced work, proving pretty conclusively that he whose cunning hand and clever brain decorated Strata Florida sprang from an old school of Gaelic artists,—that brotherhood to whom we owe the magnificent tenth-century wayside crosses which still stand at Nevern and Carew in Pembrokeshire, at Golden Grove in Carmarthenshire, and in the churchyard of Llantwit Major in Glamorganshire. In the days of its pride, a most striking feature in Strata Florida must have been the great arcade formed by the nave columns; each stood on a plinth 7 ft. high, and supported a richly-moulded pointed arch of Early Transitional work; these have been found lying as they fell outwards, with carved fragments of the capitals and moulded bases, and shafts of the piers. In the north transept was discovered the great north doorway; it had been decorated with a lily pattern, as is the north doorway in St. David's Cathedral. The respond of the south arcade is perfect to the height of several feet above the nave, and Mr. Williams believes that some portion of the piers close to the central tower exist under the *débris* which still buries that portion of the church. No less than six chapels adorned the abbey, three in each transept; those to the north had clustering piers of Early Transitional work, and were groined; the central carved boss, with its iron lamp-loop still attached, has been found in each chapel, also the bases of the altars, while the caved-in flooring marks the graves of the noble men and women who were honoured with sepulture within the walls of the holy fane. The whole floor of the church appears to have been paved with encaustic tiles, which were formed into patterns of sixteen. The individual tiles are of peculiar interest. Among them are some with armorial bearings, a plain shield with a chevron, the arms of the Despencers, the dragon of Wales, and a curious figure of a man in the dress worn during Edward II.'s reign.

The credit of this really important investigation is entirely due to Mr. Stephen Williams,

nating lay disputes to church work, probably gave the Abbey builders free access to his quarries and ports. In one of the chapels of the south transept relics of a great canopied tomb have been discovered; the head of a Saint (Bernard?) half life-size; two pair of hands, apparently male and female (life-size), raised in prayer, and some carved floral fragments. The material from which these are cut is Caen stone; probably the monument and effigies came from France. In the ruins very distinct traces of a conflagration are discernible; not only is the carved stone-work defaced by fire,

who has collected and spent on the work about 160*l.*, and moved 3,500 cubic yards of rubbish. With the rubble he has very cleverly formed a fence round the Abbey, which was absolutely necessary, for the "'Arries" who visit Aberystwith had already commenced stealing the encaustic tiles. Mr. Williams also hit on an ingenious plan for keeping the wet and frost out of the mouldering foundations; on these he has built up a few feet of dry walling, which he has sodded with turf, thus preserving the original masonry from further injury, and at the same time clearly defining what is new work. So soon as sufficient funds may be forthcoming from his friends and the public, he hopes to cover in the chapels, and thus form a sort of museum in which will be preserved such portable relics as have been and may yet be discovered. It is to be hoped that funds will be raised, not only to clear out the interior of the church, but also the foundations of the neighbouring conventual buildings,—an undertaking that cannot fail to be of great architectural and antiquarian interest. Subscriptions for the purpose will be received by Mr. R. Banks, Ridgebourn, Kington.

NOTES ON SACRISTIES.*

BY FREDERICK CHARLES EDEN, B.A.

THOUGH there has been of late years much careful study of the ancient principles of Church arrangement and their adaptation to modern needs, there has been a curious but very general agreement among architects to perpetuate a tiresome anomaly. For what clergyman, at least in these days of the inevitable surpliced choir, has not suffered from the ridiculous inadequacy of the modern vestry? It is no exaggeration to say that in nine cases out of ten the ordinary parish church is provided with a wretchedly insignificant room, situated under the west tower, or in some equally inconvenient spot, roughly plastered, and furnished with an ink-pot, a table, and a row of pegs, while the scanty floor-space is shared by an antiquated deed-box or safe, and the charwoman's unsavoury paraphernalia. Otherwise we shall find, in an old church especially, that the north chancel aisle (if there be one), though built for quite other purposes, is cumbered with a gigantic organ-case, and the cramped and irregular space behind is made to serve as a vestry for both clergy and choir. True it is that in more luxurious and quite modern instances the architect has been induced to pay some attention to vestry fittings, even to the extent of providing a continuous hanging-cupboard of pitch pine, decorated, it may be, with chamfers and varnish; but the word vestry will still recall to those who have often ventured within these *penetralia* of our country churches the impression of something between a lumber-room and a housemaid's closet.

The remedy for this slovenly state of things lies to a very great extent in the hands of the architects of our churches. Let them build stately and commodious sacristies, well lit, well warmed, and well furnished, as are the churches to which they belong; and the impropriety of having to make all necessary preparations for the service of the church in a mean, untidy, inconvenient, and often crowded vestry will be at an end.

From the fourth century onwards, we find attached to churches a room or rooms, which served various liturgical and utilitarian purposes. In churches of the basilican plan, the *scenophylacium*† (as the Greeks called it), or *secretarium* (as it was known among the Latins, and in the West generally, during the Middle Ages), occupied the space to the north of the presbytery, the *prothesis* being correspondingly situated on the opposite side. Here the bishop took cognizance of clerical causes, and pronounced judgment against heretics, or with his presbyters received the salutations of the faithful before mass. Here, too, the oblations were made, in order that the bishop might see "*a quibus accipere oblationem deberet, et a quibus accipere non deberet*"; a usage which partially survives to this day in the ceremonial of the Eastern Church. Councils, as, *e.g.*, that of Arles, and the 4th and 5th Councils of Carthage, sometimes held their sittings in sacrities; and here, finally, in an inner division or closet, were stored the ornaments of the church and of the ministers thereof. Gregory of Tours, a historian of the sixth century, speaks of a priest sleeping in the sacristy adjoining the choir; and from the same passage ("Hist. Franc.," ii., 21) we learn that in the basilica of S. Martin, the sacristy was well guarded with bolts and locks, that the public were not allowed to enter, that the walls were painted, and that the precious stuffs and other ornaments of S. Martin's shrine were kept therein.

It was not, however, until the sixteenth and seventeenth centuries that the sacristy, as now understood, where priests and ministers invariably vested, and where all the ornaments and vestments belonging to the church were deposited, became common; the sacristy of mediæval times having been adapted to curtain the furniture and ornaments appertaining to the service of the high altar only. For hitherto it had been the custom for the priest to vest for mass *coram populo*, near the altar at which he was about to officiate, both vestments and plate being kept in chests and aumbries in the chapels, and by the altars to which they belonged. For the choir offices, on the other hand, at least in cathedrals, churches, and others, where the clergy were very numerous, it was the custom for them to vest in the cloisters or chapter-house. Banners and crosses, meanwhile, were allowed to remain suspended against the walls and columns, a picturesque custom which still obtains in some continental churches,—*e.g.*, in the Black Forest. Other objects were kept in the towers, or in rooms over the vaults; larger pieces of furniture (most inconveniently, it would seem) in the porch. Hence it is that we find no Gothic sacristy fully furnished, or of a size adequate to modern needs. Many conventual churches, indeed, had no sacristy at all, some part of the adjoining buildings supplying its place; and even in cathedrals a chapel was sometimes made to serve the purpose. That such makeshifts were not uncommon proves that the necessity which later centuries supplied was already beginning to be felt.

The first question to be answered in discussing the practical side of the matter is, What is the proper position for a sacristy? Almost invariable custom in England points to the north side of the chancel. But, in spite of precedent, there are reasons why the south side should be preferred. For a situation where they may enjoy the benefit of the direct rays of the sun is more favourable to the preservation of stuffs and embroideries, which are liable to deterioration by the least damp; and, in churches where the primitive custom of separation of the sexes prevails, the south is the side assigned by antiquity to men,* and, therefore, more suitable for the sacristy where no female is permitted to enter.

As it is important that the High Altar may be promptly and efficiently served, it is well that the sacristy be not at too great a distance, so that when the site is cramped, as is too commonly the case with our town churches, a sacristy built in two stories (as at Bayeux and Coutances), but conveniently placed with regard to the altar, would be preferable to one large room in an awkward situation. The dimensions of a sacristy are determined by three considerations:—

1. The size of the church.
2. The number of the clergy.
3. The quantity of furniture and ornaments which it will be required to contain.

Thus, one small room is adequate provision for a village church, served by only one priest. A town parish, with its large staff of clergy, will require increased accommodation; while for a cathedral or collegiate church an ample room, unless supplemented by one or two annexes, will hardly suffice.

In plan it is better that a sacristy be oblong rather than square, as the latter shape is apt to cause a waste of space in the middle. In the case of large cruciform churches an L-shaped plan will often be found convenient (as at the Certosa of Pavia), both for the additional space gained and for the easy access which it affords both to the choir and to the body of the church.

The building should be roofed with a lean-to, as English mediæval custom suggests, and not gabled, at any rate in smaller instances. When, however, extensive accommodation is required, a flat roof or a gable of very low pitch is recommended in order to preserve that subordinate and utilitarian aspect which is consistent with the purposes of a sacristy. Within it must be ceiled either with boards or plaster, and in no case can an open roof be permitted. Superior sacristies will probably be vaulted.

It is always advisable, but more particularly so when there is the slightest fear of damp, to introduce a crypt or basement story, which will be found useful besides as a receptacle for bulky occasional furniture, such as the bier, and also as a cellar for the sacramental wine.

It is often forgotten that a sacristy requires plenty of light and air. Lancet or loop-hole windows, therefore, are manifestly out of place, seeing that security can be readily obtained by the use of iron bars. All windows are to be kept high enough from the ground to prevent the possibility of passers-by looking in, and one or two at least must be made to open. As a rule, the square-headed form will be found most suitable and economical of space. Sky-lights are certainly convenient both for the arrangement of the furniture and the equable diffusion of light; but they are, nevertheless, not to be recommended (except in very cramped situations), for they are ugly, awkward to open or shut, and very frequently leak.

In order that it may be possible to enter or leave the sacristy without passing through the church, an outer door should be provided in addition to that which opens into the church. Both doors should be placed as nearly as possible in corners of the building, so as to avoid needlessly cutting up the wall-space, and thereby interfering with the economical distribution of the furniture, which, it must be remembered, consists almost entirely of continuous presses ranged against the walls. In small churches the inner door is made to open directly into the sanctuary or choir, as well for readiness of access thereto as that the priest may not be compelled to disturb any part of the congregation in passing to or from the altar.

In the larger churches in Rome (where many fine examples of sacristies are to be found) a second inner door is sometimes added, communicating with the body of the church. Thus, one door leads directly to the High Altar, *per viam breviorem*, as the liturgists say, and serves for low masses, or other functions without solemnity, corresponding to the ordinary door in small churches. The other opens upon the transept, or one of the aisles, and is more sumptuously fitted, being used for those solemn entrances when the ministers move to the altar in procession. Sacristies in Rome seldom open directly into the church, but are generally approached by a vestibule, which is furnished with benches for the accommodation of persons wishing to speak to the clergy or sacristan,—an arrangement certainly worthy of imitation in churches of the first magnitude.

It is scarcely necessary to add that all doorways must be wide enough to allow the passage of two walking abreast, and high enough for banners, crosses, &c., to enter

C

* The suggestions contained in this communication appear to us eminently practical and sensible, and worth the attention of architects who are concerned in the planning of churches. We give them, however, under the writer's name, and as an expression of individual views, because we do not think it desirable that a journal dealing with architecture in the broadest sense should formally assume the ecclesiastical standpoint from which this article is written.—Ed.

† Cancellieri ("de Secretariis Basilicæ Vaticanæ") enumerates as many as twenty-three Latin and thirteen Greek names.

* Bouranée, *Du Symbolisme dans les Eglises du Moyen Age*, p. 295.

without inconvenience; that the doors must be of stout make, and provided with substantial locks, bolts, hinges, stiffeners, and, in fact, every precaution against thieves, while provision should be made for a thick curtain to hang across the inner door, to prevent any noise from within being audible to those inside the church.

Where the church possesses a heating apparatus, the sacristy may well be allowed to benefit by it; otherwise a fireplace or a stove must be introduced, as dryness is a matter of the first importance. Gas is never to be allowed; for the fumes immediately tarnish embroideries and articles of silver, while the dirt and smoke disfigure the building, and further injure its contents. All the light that can possibly be required, even in the largest sacristies, may be readily obtained from candles, whether disposed in chandeliers or in sconces bracketed out from the walls.

No intelligent traveller who has studied churches and church arrangement in Italy can fail to have been struck with the very important part there assigned to the sacristy. Often, when the rest of the church is dirty, tawdry, and seemingly little-cared for, the sacristy is found to be clean, tidy, and even sumptuous. There silence and order reign, while the familiar duties of the place are performed with regularity, promptitude, and an entire absence of fuss. Sometimes, indeed, the actual building (the gift, it may be, or memorial of some wealthy noble or ecclesiastic) can boast of real architectural grandeur, but far more often is it conspicuous for the truly admirable nature of its furniture. Presses of great size and solid make, whose doors and cornices of dark walnut gleam with rich carving and tarsia inlay, and whose interiors exhibit every kind of ingenious device for convenience of arrangement, line the walls. There it does not surprise us to find pictures by the great masters, while an altar of precious marble, and a lavatory, perhaps, of exquisite Della Robbia ware, contribute their share of beauty and utility.

Sacristies furnished like this we must not hope for at present. The old masters, Della Robbia, the tarsia work, we must be content to admire at a distance; but the rest is well within our reach. Architectural style, presses of comely and convenient shape, not to mention cleanliness and order, we may well hope to enjoy. But until the barest requirements of our churches are better understood, whether by architects or by the clergy themselves (who are often the greater offenders on the side of ignorance), we shall have to rest satisfied with the damp surplice on a peg, and the dust-pan and brush in the corner.

Before discussing in detail the various articles of furniture necessary to a well-appointed sacristy in a church of moderate size, it will be convenient simply to enumerate the more important. Such are:—1. Presses—for (*a*) vestments, (*b*) copes, (*c*) linen. 2. Cupboards for metal ornaments. 3. A safe. 4. A bookshelf. 5. A vesting-table. 6. A writing-table. 7. One or more priedieus. 8. A lavatorium. 9. An altar, with credence and piscina. 10. Extra presses, for frontals, dossals, banners, tapestries, and hangings of every description, according to circumstances.

These will be described in the order given.

1. *Presses.*—These are always ranged round the walls, and should be fixtures, adapted to the architectural lines of the building, and, perhaps, forming part of a continuous scheme of panelling. (*a*) The vestment press is arranged to hold numerous *shallow* drawers, or sliding trays, each adapted to contain *one* set of vestments (*i.e.* chasuble,* stole, maniple, burse, and veil) only, and protected in front by folding-doors. The shallowness of the drawers ($1\frac{3}{4}$ in. is ample depth) is insisted upon lest there should be a temptation to pile many vestments in one drawer, whereby the embroidery would suffer, and the stuff very possibly become heated. It is as well that the colour of the vestments should be indicated in the front of each drawer, together with the qualifying adjective, 'ordinary,' 'festal,' &c.

(*b*) The cope is a more awkward vestment to stow away on account of its size and shape; being a slightly flattened semicircle, with radius of from 4 ft. to 5 ft. In France, semicircular presses, fitted with drawers made to turn about a centre, are in vogue; but these are not recommended, as their bulkiness is in no way compensated for by any additional convenience. It would be equally unadvisable to revive the old quadrant-shaped chests with which we are familiar at York and elsewhere, picturesque though they be. In many churches it is the custom to hang both copes and chasubles from frames or triangles, a method which has the advantage of avoiding folds, and of enabling the vestments to be thoroughly aired by merely opening the doors of the presses in which they are hung. The disadvantages of the system are that it is apt to pull the stuff if the vestments be rich and heavy, and that in the case of the chasubles it necessitates separate drawers for the stoles, &c. But, as a matter of fact, it is found that copes can usually be folded without injury, and so laid in drawers like the chasubles.

(*c*). Little need be said about the linen press. It commonly contains several drawers of varying sizes, and a hanging cupboard for surplices in actual wear.

2. For the convenient bestowal of the numerous metal ornaments, such as candlesticks, vases, crosses, &c., which a well-furnished church possesses, one or more cupboards will be required. These may be arranged along the tops of the vestment presses, provided only that those which are designed to contain objects in constant use be not placed so high as to necessitate the use of steps. The shelves are usually lined with green baize, after the manner of those in a butler's pantry.

3. Every church possesses a fireproof safe for the custody of the sacred vessels, registers, and other articles of great value. The proper place for this is the wall of the sacristry, where its native ugliness can be concealed behind the panelling, though, of course, without any useless attempt at secresy.

4. A bookshelf of small capacity is needful. It will only be required to hold almanacks and other books of reference likely to be consulted by the clergy, altar books (unless of great value), and, perhaps, one or two books of private devotion; choral and other books for the signers being kept in the vestry appropriated to their use.

5. The vesting table has no fixed place. It may be either in the middle of the sacristy, or, as is more usual, against the wall. It stands on a platform or footpace of wood, projecting 4 ft. in front, and is required to be large enough to allow three to vest at it simultaneously. The top of the vestment press is frequently made to serve this purpose. The dimensions of the slab must be not less than 9 ft. by 3 ft. by 3 ft. 5 in. high.

6. Of the writing-table there is nothing to be said, except that it ought to be of substantial make, convenient shape, and service-size. In village churches, and when the sacristry is necessarily small, a portable desk can be made to serve the purpose.

7. The number of the priedieus is, of course, to be suited to the number of priests; but it is seldom that more than three will be required.

8. Partially or wholly recessed in one of the walls is the lavatory, which is exclusively reserved for washing the hands of the priest and his ministers before any religious function. In the older examples it is composed of two parts, the cistern and the basin, and is either simple or monumental in character. In the former case a suspended or otherwise movable vessel of china or metal (of which an example may be seen in the South Kensington Museum) does duty for the cistern. In the latter, it is of stone or marble, provided with taps on the under-side. It will usually be found more convenient nowadays to lay water on; but in remote country places, where this is impossible, one or other of the mediæval expedients may well be adopted, as at any rate possessing more dignity and refinement than the portable washstand, with its usual complement of domestic utensils, which is generally to be found in our vestries. The basin is provided with a drain leading to a dry well, as is the case of piscines, and a roller for a round towel is placed at the side.

9. In large sacristies an altar is a necessity, and a desideratum in all. It stands against the wall at one end, and is often found recessed. This altar follows the ordinary rules for minor altars. That is to say, it will have a foot-pace, a shelf for cross and candlesticks, a credence and a piscina. Its uses are manifold; for bishops to vest at; for priests to retire to for prayer and recollection; for special ceremonies, such as benedictions of vessels, vestments or banners; admissions to guilds and confraternities, &c. In addition to these practical uses an altar imparts to the place an air of sanctity and solemnity; and this is presumably the reason why S. Charles Borromeo, in his "Instructiones Fabricæ Ecclesiasticæ"* (a small manual to be consulted with profit by all church architects for its union of sound sense with right ecclesiastical feeling) recommends that the vesting table should be arranged as a quasi-altar when space fails for an altar proper.

10. The additional presses, of which a well-furnished church will require several, must range themselves wherever space permits. A very useful shape for them to take is that in which the lower part projects, forming a continuous bench-table, or seat, broken up into compartments with separate lids. These can be appropriated as receptacles for candles, stocks, charcoal for the incense, wicks for the lamps, linen to be washed, &c., and will be found handy for such and many other purposes. The upper part is fitted as a series of hanging cupboards, or with drawers, shelves, or trays, according to the uses it may be intended to serve.

Whenever possible there should always be a commodious closet opening out of the sacristy, in which brooms, pails, steps, &c., are to be kept, as well as supernumerary chairs and benches.

As it was intended that these suggestions should be practical throughout, nothing has been said on the æsthetic side of the question; but there is no fear that an architect, who had any respect either for himself or for the services of the church, would neglect the beauty of that upon which the public are not permitted to gaze, or the convenience of that upon the utility of which the efficient performance of these services so greatly depends.

* A chasuble (Gothic shape) is about 54 in. long by 44 in. broad in the widest part. It can usually be partially folded in the direction of its width without damage.

NOTES.

VOLUMES III. and IV. of the "Papers of the American School of Classical Studies at Athens," the substance of which relates to the years 1884-6, both appear at last under the date 1888. This, even for an archæological periodical, is somewhat tardy issue. However, the material is weighty. Volume III. contains the complete official report of the "Wolfe Expedition to Asia Minor," conducted by Dr. Sterreft, the main results of which belong to the domain of epigraphy, and will scarcely be of interest except to the specialist. Volume IV. appeals to a wider circle. It contains a paper by Mr. Walter Miller, on the theatre at Thoricus, with supplementary report of the excavations there by Mr. Cushing. The report is accompanied by six plates, giving full views and plans of the theatre, to the discovery of which we have from to time drawn attention. The theatre is of very remarkable shape,—oblong, but rounded at one end and square at the other. The site gives no sufficient explanation of this eccentricity. The paper that comes next in interest is a discussion by Mr. John M. Crow, on the Athenian Pnyx. He is, as we believe all modern investigators are, entirely averse to the view of Dr. Curtius,

* In omni sacristiâ sit altare, vel mensa, armariumve, quod formam altaris præbeat, instructum cruce, candelabris, mappâque constratum.

who would transform the time-honoured site into a seat of the worship of "Pelasgian Zeus." The Pnyx, as restored on the plan appended to the paper, is a theatre-shaped space, as, in fact, a place of assembly for whatever purpose would, among the Greeks, naturally be; the orator standing on the bema, which was practically the altar, merely took the place of the protagonist in a dramatic representation. The Report of the "School," appended to Vol. IV., contains, we believe, the first *official* announcement that Dr. Charles Waldstein has been chosen Director of the School for the five years beginning in October, 1888, and has accepted the appointment on condition that a sufficient permanent fund be raised to support the School under its new organisation. The yearly change of Director, hitherto the custom in the American School, has, no doubt, been attended with serious disadvantages.

IN reference to the recent circular of "General Advice" on restoration, issued by the Institute of Architects, Mr. A. W. Blomfield, whose name, along with that of Mr. Pearson, was rather prominently mentioned in the *Journal of Proceedings* as having given some special attention to the framing of the document referred to, writes to us to disclaim most emphatically having had anything more to do with drawing up the paper than any other member of the committee.

IN the number for Sept. 29 of *L'Architecture*, M. F. Roux considers the question of the proprietorship of the architect in his drawings. After referring to the various opinions on the subject, M. Roux propounds the view which we have often expressed, but which lawyers, as a rule, seem quite unable to understand, that the drawings are the architect's property, being merely his means of conveying his instructions to the builder; that the client comes to the architect to construct a building for him, not to make drawings. "Ils" (the architects) "ne doivent aux clients pour lesquels ils construisent que la *construction édifiée*, aux entrepreneurs que des indications précises de leur travail, comme ils le jugent nécessaire. Quant aux copies de leurs minutes, si on leur en demande et s'ils consentent à les donner, elles doivent leur être payées à part." This is the common-sense of the matter, at all events where it is a question of buildings executed. M. Roux observes that the case where an architect is asked to make a scheme for a building which for any reason is not carried out, or not intended to be carried out for an indefinite period, requires separate consideration, and he proposes to deal with it in another article.

WE have received a pamphlet, by Mr. John D. Sutcliffe, on what would seem to be the neglected but highly important subject of the "ventilation of cotton mills.* The author states that for the past three years he has inspected and reported on more than a thousand mills in all parts of the kingdom. He has "very often found that a few air inlets and a hole in the roof were all that was necessary for ventilating purposes" (so printed; "all that was thought necessary" we suppose is intended, as one main object of the pamphlet is to recommend mechanical ventilation by fans). The author recommends what he calls fans "of the air propeller type," but from the context it appears that what he means to recommend is an extract-fan rather than a system of propelling fresh air in under pressure. If this is what is meant he is unquestionably right. Any room in which there are many workers, and work carried on which must fill the air with numberless small particles of matter, requires mechanical extract ventilation to draw all impurities out as directly and powerfully as possible. In regard to spinning-rooms, we read that

"There is always a difficulty in ventilating spinning-rooms, especially where fine counts are spun. Practical spinners often assert that a high temperature is really necessary; but a good deal of this statement is prejudice. I have in my mind a Rochdale firm, who determined at any cost to reduce their temperature, and who now say they can spin as well at 65 deg. as they could at 85 deg., and they are usually engaged on 60's counts."

It would have been somewhat to the purpose to know why there is any real or supposed necessity for a high temperature for spinning "fine counts." This expression refers to the finer forms of thread, some of which run to a good many miles to the pound, but we have been unable to extract from cotton spinning correspondents any definite reason why high temperatures are required. We are informed that at the Manchester Exhibition the spinning of the finest counts was deferred till summer weather, but that no artificial temperature was used. The case mentioned in the above quotation seems to indicate, at all events, that cooler temperatures have been found compatible with the manufacture, and in that case every cotton-mill owner ought, for the comfort and health of his hands, to endeavour to attain these conditions. Then we read—

"Ring-spinning rooms suffer most from the heat. Last February I was in one containing 35,000 spindles, and when the outside temperature was at 45 deg. F., the temperature in the room reached 98 deg. F. This excess of heat was caused solely by the speed of the machinery, as they had no artificial heat in the room. I found it necessary in this instance to fix four 2 ft. fans down one side of the room to exhaust the hot air out, and one 3 ft. fan, fixed nearly at the opposite side, to blow the cold air in. The air from the 3 ft. fan was carried well into the room along a duct with perforated sides, and no draught was felt."

We presume the heat in this case was caused by the presence of an immense number of heated bearings in the machinery; we do not see how otherwise the speed was to raise the temperature of the room. The "gassing-room" is another department in which great need is felt of through ventilation, as will be understood when it is explained that "gassing" means burning off with gas what are called the "thick-ends" of the yarns; one can easily imagine what a stuffy room this would be without a powerful mechanical ventilation. The author also draws attention to the unscientific way of heating large rooms in cotton-mills, by steam pipes placed high up on the wall (with the idea of getting them out of the way), leaving the workers to suffer from cold feet, and consequent neuralgia, &c. Mr. Sutcliffe's object is an excellent one, if his definitions and suggestions are not always very lucid. A short preface by Mr. E. H. Osborn (H.M. Inspector of Factories) points out that the workpeople in these mills are breathing over and over again the same air, "more or less impregnated with dust and other impurities," and that "the solution will only be found in mechanical appliances mechanically driven with all possible economy of space and power:" in which opinion we entirely concur. We hope the subject will not be allowed to drop.

WE have received from the Local Government Board a short report by Dr. Parsons on the prevalence of diphtheria at Kilkhampton, in Cornwall. Dr. Parsons describes Kilkhampton as being on the whole, in point of sanitary condition, "better than the average of Cornish villages." The chief fault of the houses is dampness. "The floors are commonly of flagstones, and the eaves of the roofs are rarely spouted. The interiors of the houses were generally found clean, but the surroundings of many of the outlying ones were far from cleanly, the yard in front containing accumulations of manure and stagnant water." The village is partly sewered by glazed pipes, but one part is drained by an open gutter in front of the houses; other houses drain into ditches; at others waste water is poured on the gardens or ashpits. Water-supply is from pumps, mostly good, but in some places it is from wells which are liable to be contaminated. Dr. Parsons does not appear to have laid his finger on any insanitary conditions to which the outbreak of diphtheria in this case can directly be traced; but obviously the defects above referred to call for remedy, and it is a somewhat serious reflection that this is a place "above the average of Cornish villages" in sanitary condition. Kilkhampton is in the Stratton Rural Sanitary District of Cornwall

---

THE Charity Commissioners have arranged for the purchase of the site and buildings of the Royal Naval School at New Cross, and undertake to subscribe 2,500*l.* per annum towards the Technical and Recreative Institute which it is proposed to open there. Through a munificent gift by the Goldsmiths' Company of a like sum, yearly, the Committee of the South London Polytechnic Institutes are placed in a fair way of establishing their scheme in that district. The school was founded for officers' sons, in 1833, at Camberwell. On June 1, 1843, Prince Albert laid the foundation of the existing premises—a handsome, spacious building of red brick, in the Hatcham district, fronting Lewisham High-road. The site, of seven acres, is on Gunter Hill, near to Plow Garlick Hill, whereon used to stand a semaphore, the second out of town, on the line of signal stations worked upon Captain Popham's system, between the Admiralty and Deal. The intervening station was in St. George's Fields; and under favourable conditions a message could be forwarded the whole distance of seventy-three miles in sixteen minutes. New Cross is reputed to take its name from the once celebrated posting-house, the Golden Cross, on the road to Dover. In his diary Evelyn writes, under date Nov. 10 (1675). "Being the day appointed for my Lord Ambassador to set out, I met them with my coach at New Crosse." The ambassador was George, fourteenth lord and first Earl of Berkeley, who had been appointed to France, and as plenipotentiary for the general treaty of peace at Nimeguen. The subscription of 2,500*l.* a year by the Goldsmiths to what will be known as the Goldsmiths' Company's (New Cross) Institute is from out of their corporate funds, not being trust funds, over which they have absolute control. According to information supplied by them to the School Board for London, in March, 1879, their list of fifty-eight divers charities represented an annual disbursement of 10,901*l.* 14s. 1d. In their report of February, 1881, the Board maintain that there is a total income of nearly 113,000*l.* a year derivable from the trust funds of the seventy-eight City Guilds which, in terms of Section 30 of the Endowed Schools Act, 1869, should, in their opinion, be re-appropriated towards the support of higher elementary and technical schools.

LAST week, in response to an expressed desire on the part of the Finance Committee, the architects and measurers of the Glasgow Exhibition furnished a statement of the total structural costs to the close of September. The estimate of the architect before the commencement of operations stood at 69,128*l.* Up to the period of the opening, early in May, the work accomplished (so we learn from this statement) represented an outlay, actually, of 74,461*l.*—an excess of about 7½ per cent. over the forecast, and certainly, under the circumstances, not an outrageous excess over the original reckoning. The main building, with foundations, had by that time summed to a total of 58,847*l.*, or about 5,000*l.* higher than the estimate, and therein accounting for very nearly the whole of the gross excess. Boiler-shed, chimney, and sundry other less bulky erections of the "lean-to" order cost 3,262*l.*, while the grounds and all independent works and erections thereon, including the Bishop's Castle and the deepening of the Kelvin, ran to a total of 12,352*l.* Analysis of individual items shows that the Bishop's Castle cost 2,035*l.*, as against 1,800*l.* estimated, and the Kelvin excavations 1,121*l.*, as compared with 830*l.*, the original allowance; but, on the other hand, there was a saving of nearly 300*l.* on the making-up of the grounds, attained partly by the co-operation of the Parks permanent staff of gardeners and workmen. Structural outlay by no means ceased at the nominal completion of the building, but has been going on to a certain

* Buckley & Bland: Manchester.

extent ever since. From the beginning of May to the end of September the work done has been largely of the jobbing order, but the cost of it has nevertheless mounted up to the respectable figure of 8,253*l.*, and this, joined to the above, gives a gross total of within a few pounds of 83,000*l.*, to which, no doubt, before the terminal audit, there will have to be added the usual more or less trifling residuum of overlooked items. It has been decided to close the building finally to visitors on Saturday, November 10th, and to enact the formal or ceremonial closing on the Monday following. The gross attendance up to the end of last week stood at about four millions and a half, and thus considerably in excess of the Manchester Exhibition figures at the corresponding period of its career; but in the matter of payment by single admission, it should be noted the latter had the lead. General sorrow has been expressed at the untimely death of Mr. James Sellars, the designer and architect of the Glasgow Exhibition, which event took place on Tuesday last, and is elsewhere mentioned by us.

SOME specimens of what claims to be a new way of producing coloured decorations on glass have been submitted to us, under the name of the "Valère Patent Translucid Enamelled Glass." The special feature of this glass is that the coloured design, painted in enamel on the glass, and fired into it (we are informed) at a high temperature, exhibits a colour design on both sides, the colour showing in the day-time from the inside by transmitted light, and from the outside by reflected light; the conditions being reversed when the building is lighted at night, when the design is seen internally as a coloured one by reflected artificial light, and externally by transmitted light. The specimens submitted to us were very poor in design and colour, which, however, of course, does not affect the idea itself, which might be equally applied to glass of good colour and design. We can, however, see no recommendation, but rather the contrary, in the fact of the glass showing external colour by daylight. Stained glass, as at present used, is emphatically a form of decoration for interior effect; it is the most vivid and effective form of internal polychromy, and is, or should be, designed to harmonise with the general decorative design of the interior, of which it forms the richest and most brilliant portion. It by no means follows, however, that an equal display of the colour externally would be considered an advantage by architects, unless the building were designed externally on a system of rather brilliant constructive polychromy, with which this externally-coloured glass would harmonise; and that would need almost a revolution in our usual methods of building. In a stone or brick church of a quiet type of external treatment, such as are nineteen-twentieths of our churches, this "Valère" glass would merely have a gewgaw effect externally, and be out of keeping with its conditions. The preservation of the internal colour, when the building was lighted at night, would not be open to the same objection. It must be remembered, however, that it is by no means possible always to design stained glass so that it should appear equally satisfactory, as a matter of design, from either side.

IN reference to the recent protest made by a member of the Society for the Protection of Ancient Buildings in regard to the restoration of Ormskirk Church, the churchwarden, Mr. Hutton, writes a letter to the *Times* of Tuesday, giving an account of the condition of the church which led to its restoration. The architect under whom the work has been carried out is, it appears, Mr. Paley, than whom there could not be a better or safer guide. Some of the details given about the condition of this church throw an interesting light on the kind of thing which appears to be dear to the champions of the "conservative" (?) treatment of churches:—

"The interior of the church was surrounded by unusually large, deep, and wide galleries, erected probably 1750-1790. The ground floor was covered with irregularly-sized pews, some large enough to hold a dozen persons, and provided with lock, key, and bolts, and some correspondingly small and inconvenient (in fact, in some of them lads have been known to stand upon their heads during service, and that unseen by the parson); the floor surface had been raised from 2 ft. to 3 ft. with a mass of corruptible matter, and which has been evidently disturbed over and over again, owing to the custom, about a century ago, of burial within the church. From twelve to twenty skulls were found in one heap, having evidently been placed there because they had not decomposed with the other bones. On the removal of the pews referred to, a single inch board was found to divide the living from the dead, the bones had so worked to the surface; plaster and whitewash covered the walls. The arcade had been taken away to make room for the galleries and to provide accommodation for private boxes, as the pews could not be well termed by any other name."

Mr. Hutton's opinion is that the benches that were sold to an American school of art (as before noticed) were totally unfit to be retained, "being narrow, inconvenient, and worm-eaten benches of the rudest construction." This does not quite accord with the terms of the announcement which we quoted before (page 226, *ante*), in which the said benches were spoken of as things of some interest concerning the fate of which the congregation would be glad to be informed; though it may be very possible that they were, even in that case, inconvenient for their purpose. But the description of the state of the rest of the church, which it appears to be considered an act of sacrilege to disturb, is rather significant as to the state to which our churches would come if left to the "conservatives."

A MONUMENT has been erected in St. Giles' Cathedral, Edinburgh, to the memory of the famous Marquis of Montrose who distinguished himself in the cause of Royalty during the Civil War which preceded the Restoration. The origin of the monument may be attributed to a remark made by the Queen when being shown over the cathedral after its restoration. When shown the spot where were collected the scattered remains of the "Great Marquis," which were brought together by order of Charles II., and interred with State ceremonial in St. Giles' on May 11, 1661, her Majesty expressed her surprise that there was no memorial to so remarkable a man. An influential committee was formed, including the Duke of Montrose, and subscriptions to the extent of 1,100*l.* having been obtained, Dr. Rowand Anderson was commissioned to prepare designs for an appropriate memorial. In preparing the design, Dr. Anderson has endeavoured to produce a memorial in the form which it would probably have assumed at the time of the burial. The principal feature of the monument consists of a recumbent figure of the Marquis in white marble resting upon a slab of black marble, superimposed upon an alabaster sarcophagus ornamented with festoons and other detail, occupying a deeply-recessed semicircular arch. This recess is flanked by Corinthian pillars of black and gold marble having alabaster caps and bases, and the centre of each column is incircled by a gilded wreath. The pillars support a frieze, entablature, and cornice, and over each pillar is a cupid supporting a shield with armorial bearings. The frieze is ornamented with floral wreaths and decorated panels containing mottoes. In the spandrels of the arch are shields with heraldic devices, and in a large panel over the cornice is quartered the full coat-of-arms of "The Graham," flanked by carved balusters and dolphins. The large panel is surmounted by a semicircular pediment, and over that is a smaller square panel containing a crest. The inscription appears on a panel under the recess over the figure. The sculptors are Messrs. J. & W. B. Rhind. The whole relieved carving is gilt, and the combination of marble, alabaster, and gold produces a very rich and striking *ensemble*. It is proposed to place in the Montrose "aisle" or chapel, where the monument is placed, a stained-glass window, at an additional cost of 300*l.*, the execution of which has been entrusted to the Messrs. Ballantine.

BAYNARDS, a historical and finely situated property, in Ewhurst and Cranleigh parishes, Surrey, will be put up for sale at the Mart on the 30th inst. It forms portion of the ancient royal demesne of Gomsal, which is cited in Domesday Survey as having been held by Earl Harold. Vested in the Crown until 1135, it was bestowed by Stephen upon his illegitimate son William de Blois, Earl Warrenne. It subsequently passed in turn to various families, including that of Braose, the De Brayes, the Mores, and the Duke of Montague. In the mansion has been preserved a good collection of armour and relics; amongst these a tilting target used by Henry VIII. when a youth; and, in a chest that belonged to him, the head of Sir Thomas More, since interred, by his daughter Margaret Roper's filial piety, in the chancel vault at St. Dunstan's, Canterbury. To the present Tudor residence appertains an estate of some 1,500 acres, including a park, with some woodland and small farms.

ON Saturday last an opportunity was afforded to a number of representatives of the Press of viewing the extensive vaults on the premises occupied by Messrs. H. R. Williams & Co., wine merchants, Lime-street, E.C. These vaults cover the site of the well-remembered buildings which formerly belonged to the East India Company, in Leadenhall-street, who for more than two centuries and a-half exercised commercial and military rule over the vast Eastern dependencies belonging to this country. On the termination of their charter in 1860, the East India House,—which for many years was the seat of Indian Government in London,—together with the great buildings in the rear, covering an acre and a-quarter of ground, were sold to a syndicate of capitalists (including the late Sir William Tite and Mr. E. N. Clifton, the architect of the present buildings) for 155,500*l.*, who pulled the whole down, and upon their site erected the large pile of buildings now known as the East India-avenue, and occupied by merchants, shipowners, and others. These extensive cellars are one of the sights of the London wine trade, and are fitted with some very ingenious steam machinery for bottling, corking, bottle-washing, &c. This machinery has been invented by Mr. J. Thompson, of Horselydown. In the immediate vicinity of the bottle-washing department is an arched brick vault, not unlike a railway tunnel, 320 ft. in length, and 20 ft. in breadth, with a tramway running down the centre; on either side are tiers of casks one above the other, containing port, sherry, and claret, the latter predominating, stretching far away into the darkness beyond. On the east of this are two parallel vaults of considerable dimensions, and intersecting these are numerous other vaults, the smallest of which measures some 60 ft. in length, but all of the same height, and wide in proportion. These are mostly fitted with strong iron divisions or bins for the storing or maturing of wines in bottle. One very commendable feature of this establishment is the provision on the premises of a dining and reading room for the men and lads employed by the firm, together with a clothes and boot room, in which each *employé* has his own compartment.

THE danger attending the use of gas-heated baths is again evidenced by the proceedings which took place at a coroner's inquest held before Mr. G. P. Wyatt, Deputy Coroner for East Surrey, on Wednesday evening. It appears that Mr. David William Chalmers, aged twenty-one years, assistant librarian at the Norwood Free Library, Knight's-hill, West Norwood, was discovered dead in the bath-room attached to the library last Sunday morning. Mr. Frank James Burgoyne, librarian, said that the deceased resided upon the premises. Last Sunday morning about nine o'clock deceased went to have a bath, and was absent for some considerable time.

Witness knocked at the door, but finding that it was locked, and receiving no response, he got on the verandah in the front of the building and entered the bath-room by the window, when he found the deceased lying on the floor partially dressed, and insensible. Witness carried him into the passage, and, failing to restore animation, sent for a medical man. In answer to the coroner, witness said that the bath was heated by a gas boiler, and that when he entered the room the gas was turned full on, and the place was full of smoke, Dr. Harris of Knight's Hill-road, deposed that he was called in about half-past 9 o'clock on Sunday morning, and found life extinct upon his arrival. He had since made a *post-mortem* examination of the body and discovered that the cause of death was poisoning by carbonic oxide and carbonic acid * gases given off by the heating apparatus. In witness's opinion the deceased, instead of turning off the gas, turned it full on, and was overcome by the fumes before he was aware of it. The coroner having commented upon the lack of safety in such an apparatus, the jury returned a verdict of "Accidental Death." It would be interesting to know whether the bath-room was provided with any means of ventilation.

WE understand that the biography of the late Sir William Siemens, prepared with the sanction of the executors by Dr. W. Pole, F.R.S., Honorary Secretary of the Institution of Civil Engineers, will be published, in the course of the present month, by Mr. Murray.

THE *Estate Clerk of Works* is the title of a paper of which we have received three or four numbers, and which has been started as a medium for giving practical information and interchange of experience in regard to the special business of clerks of works and managers of estates, as distinguished from the clerk of works on buildings. There is no doubt that estate clerks of works have a special line of work requiring special experience, and the paper appears to promise a considerable amount of practical information of the kind required. It will hardly be improved or rendered more valuable, however, by adopting a habit of sneering at architects, and representing the architect as a person who only cares for the outside appearance of a house: an implication which shows ignorance as well as impertinence. The conductors of the journal in question will more consult its credit and usefulness by keeping to what they understand, and not meddling with things they evidently do not understand.

Glasgow Architectural Association.—The usual monthly meeting was held last week, the President in the chair. Two short papers were read, the first of these, by Mr. A. W. Beaton, on "Wrought Iron Work." An interesting review was given of the history of this material. Numerous drawings and specimens of iron work, lent by Mr. Adam, smith, were exhibited. The second paper was on "Church Organs," by Mr. Larmont D. Penman. The disposition of the internal arrangement, as dictated by constructional and acoustic requirements, was first considered, and the too common error of packing into a small recess was noted and condemned. The materials themselves, both metal and wood, were next described, and finally the organ as an architectural adjunct in form and decoration was discussed. Brief discussions followed the reading of the papers, and their authors were awarded the thanks of the meeting.

The Association of Public Sanitary Inspectors of Great Britain.—At the annual general meeting of this Association, held on the 6th inst., at the Townhall, Westminster, Mr. Hugh Alexander, Chief Sanitary Inspector, Shoreditch, was unanimously re-elected chairman of the Council for the ensuing session. Dr. A. Newsholme, Medical Officer of Health, Brighton, was elected an honorary member, and there were also sixteen members and seven associates elected.

* The *Times*, from whose report we quote this evidence, says that the cause of death was poisoning by *carbolic* oxide and *carbolic* acid! Of course we correct the mistake.

Vase, with Figures of Centaurs and Lapithæ (Italian Renaissance).

ITALIAN RENAISSANCE VASE.

THE accompanying engraving of a very beautiful example of Renaissance workmanship is one from among a set of drawings on wood which were executed by Mr. Robert Dudley for the late Sir Digby Wyatt, and apparently intended to form illustrations to a book on decorative work which he did not live to carry further than a collection of very rough notes.

The drawings on the wood had been made with great care and delicacy by Mr. Dudley, who brought them to us for our inspection, but in many cases the blocks were not accompanied by any memorandum which could serve to identify the object represented, or the place where it was to be found; and this is the case with the vase here represented.

On the principle, however, that good work is good work, and that its name and "provenance" are matters quite apart from its artistic value, and inasmuch as we regretted to see some admirable drawing on wood thrown away and wasted, we have selected some of these blocks for their own worth, and have had them engraved by Mr. J. D. Cooper.

The vase here given is evidently a work of the best period of the Renaissance, the figures being beautifully designed, and the whole full of that exuberance and refinement in the decorative employment of the figure which is the characteristic of the Renaissance; refinement in the design and execution of the figures, that is to say, for Renaissance art was, we need not say, by no means always refined in its application of the figure as a part of a work of furniture or goldsmith's design. In the present example, however, there is, perhaps, nothing to find fault with in the matter of good taste, except that the female figures introduced within the handles, and forming in reality a part of the handle, hardly combine well with the line of the handle, which is also rather too thin to appear a sufficient support to them. The manner in which the main bas-relief subject is kept within the outline of the vase is very good; and the projecting groups round the base are not only fine in themselves, but give breadth to this portion of the design, and are very well combined with what may be called the architectural portion of the pedestal design.

The Carpenters' Company's Free Lending Technical Library.—We are asked to mention that the above library, containing the best works on carpentry and joinery, is now open every day from 10 till 4, and Friday evenings from 5 till 8 p.m., at the Company's Hall, London-Wall.

New Townhall, Trowbridge.—A new Townhall has been erected at Trowbridge, Wilts. Mr. A. S. Goodridge, of Bath, is the architect. Special attention has been paid to the ventilation, which is on the Boyle system.

INVENTIONS, AND HOW TO PATENT THEM.

BY A BARRISTER.

THERE can be no question that there are thousands of persons who are authors of ideas that are of marketable value, which, if they were only shown the way, they could turn to solid advantage to themselves, and, at the same time, benefit the community at large.

Among the popular errors which are allowed to go uncorrected are the following: Firstly, that to be worth anything, an invention must be an intricate matter, involving great technical knowledge, and discoverable only by very learned people; and, secondly, that to get a patent for an invention is a costly proceeding, taking a long time to obtain, and then only through the medium of patent agents and high fees.

Both of these ideas are utterly erroneous. It is possible to invent without being possessed of extraordinary ability, and it is easy and inexpensive to patent an invention if only inventors are willing to take a little trouble, and spend a little time in mastering the very simple rules which should guide them, and which it is the object here to put before them concisely and without technicalities, giving information which is reliable, as the outcome of some experience and of the consideration of decided cases.

It is, perhaps, not astonishing to learn that Howe and Singer both made enormous fortunes by their sewing-machines; the former deriving 100,000*l.* a year, and the latter dying worth 3,000,000*l.*; but the gentleman who "invented" the india-rubber tip to pencils (a not very wonderful idea) pockets the respectable sum of 20,000*l.*, while the inventor of those metal plates for the soles of boots and shoes had a quarter of a million sterling as the reward of his idea. The inventors of children's toys have realised sums which seem almost fabulous. "The dancing Jim Crow" (a not by any means ingenious toy) dances to the tune of 15,000*l.* per annum; while the revolving card-board disc, through whose slits one sees figures pass as if in motion (an old idea improved upon and called "the wheel of life"), proved a wheel of fortune, too, for the inventor spun a golden thread of 100,000*l.* by its means.

These are only a few of "the happy thoughts" which have proved veritable gold mines to those to whom they have occurred, and who have been wise enough to patent their ideas.

It is quite true that formerly it was a costly proceeding to obtain a patent, but, thanks to a recent Act of Parliament, an inventor may have a chance of securing a fortune by patenting his invention at a cost of only 4*l.*

Before describing how this can be done, it will be as well to define what a patent is.

A patent, then, is the exclusive privilege of making or working a new manufacture for a certain period, during which you, and you alone, are entitled to benefit by it, unless, of course, you choose to sell or transfer the patent right, which you can easily effect if you should be so inclined.

The next question to consider is what are the different kinds of inventions for which patents are granted? They are the following:—

1. The making of some *new* article.
2. An *improvement* on some *old* article.
3. An *improved method* of making some old article.
4. The discovery of some *useful principle* and the practical application of it.
5. A *new method* of producing some useful *quality* in an article.

As a rule, invention takes the form of an improvement upon some old article or upon the process by which it is manufactured, and this improvement may consist of the addition of something *new* or the combination of two or more old well-known articles, but which are applied in some novel manner. Any invention is patentable by which an article is made better and cheaper than by the old method. As an illustration of an improved method, mention may be made of Macintosh, who realised a large fortune by substituting india-rubber in a liquid state laid *between* two fabrics instead of coating the *outside* of the material with the india-rubber. A patent will be granted for a cheap method of making a well-known article; thus, Mr. Young discovered that paraffin oil could be readily and cheaply manufactured from bituminous coal,—patented his process and made a fortune, notwithstanding the fact that the chemists had, years before, been in the habit of manufacturing paraffin oil, but by a tedious and expensive process. In a word, the *principle* may be as old as the hills, so long as your *application* of it is new. Two other points about inventions: it is well to bear in mind that they must be *new*, and they must be *useful*. In other words, you must not let the *public* use your invention, and then try to take out a patent for it, for you will be met with a refusal from the Patent Office. But this applies only to a public use of your invention; and there would be nothing to prevent your openly experimenting, or even allowing a friend to test your invention in his manufactory, say, for a month, to see if it really is a good thing, prior to your applying for letters patent.

The Patent Office does not, indeed, trouble itself about the ability or non-ability of your invention, but it is obvious that it would not be worth while to patent an article not superior in any way to one of the same kind already in the market, or to patent a process which is neither more rapid nor cheaper than the one it seeks to supplant.

As far as obtaining a patent is concerned, it matters not if your invention is the outcome of years of study and experiment, or the result of a sudden inspiration, or even of the merest accident. In fact, in the history of inventions there are numerous instances where the happy idea, which has brought fortune along with it, was, in its inception, nothing more than some "dodge" to save time and trouble, or a substitute for something which was wanted, but not at hand.

Having thus briefly indicated *what* can be patented, the next point to consider is,—Who can apply for a patent? To this the answer is,—The true and first inventor or his legal representative, neither of whom need be British subjects. Nor need the inventor have actually discovered the invention, for so long as it has been hitherto unknown in the realm, he may be simply the importer of it from a foreign country. But here take note that "unknown in the realm" includes all places under English rule. Where the invention is the outcome of two or more persons working together, each of them will do well to see that the application for the patent is made in their *joint* names, for it has happened before now that application has been made by one of a set of inventors who, getting the patent in his name, has left his co-workers out in the cold and without redress.

We now come to the *modus operandi*,—the method of obtaining a patent. All forms and stamps required can be obtained at any money-order office in the United Kingdom. A copy of the Patent Office Rules, with a list of all necessary forms, can be obtained from the Comptroller-General, Patent Office, 25, Southampton-buildings, Chancery-lane, London, post free for sevenpence; and to him address all subsequent communications. Having got your forms, the first one you will fill up is the application. This is how it runs:—

"I, , do solemnly and sincerely declare that I am in possession of an invention for ; that I am the true and first inventor thereof, and that the same is not in use by any other person or persons, to the best of my knowledge and belief; and I humbly pray that a patent may be granted to me for the said invention. And I make the above solemn declaration conscientiously, believing the same to be true, and by virtue of the Statutory Declaration Act, 1835.

Declared at , the day of , 188 .

Before me,

A Commissioner to Administer Oaths in the Supreme Court of Judicature."

The blanks in this form of application are filled in thus:—First, the name in full of the inventor; second, the title of the invention; third, the place and date of application. When the form has been filled in, you must take it to a solicitor who is a Commissioner to administer oaths; he will sign the form after you have signed it, for which he can claim 1s. 6d., and no more. There is not much difficulty to contend with so far; in fact, the only part of the application which need trouble you is *the title* or descriptive name of your invention. A few simple rules will help you over this difficulty. In your title you need not go into particulars,—that you will do in your "specification." You must take care not to claim for your invention more than it can accomplish; for instance, a patent for a machine would be void if, claiming to cut leather, copper, and steel, the machine would *not* cut steel, although it cut leather and copper to perfection. Remember, too, that if your "specification" claims more for your invention than your title does, your patent would be void. With very little thought you will be able to give your invention a proper name, and here a useful hint. The Patent Office in London, and the free library in most large towns, contain a complete set of the Patent Office books. Run your eye over one of these, and you will soon see how to describe your invention, for there are lists of thousands of inventions. The Patent Office, 25, Southampton-buildings, Chancery-lane, London, will send you a list of towns where these books may be seen if you send 2½d. to the Comptroller, requesting that a list may be sent you.

When you have filled in your application form to your satisfaction, and got it signed by a Commissioner to administer oaths, you must fill in your specification form. This is not a very difficult matter. The specification is a description of what your invention is and how it is worked.

Begin it with the title, which must be worded the same as the title in the application. If you cannot clearly describe your invention without drawings, put drawings in. Then sign and date your specification (you must make out two copies of it). Now you must get a 1*l.* stamp at the money-order office, for this is the fee payable on application for a patent, put your application form and your two specification forms into an envelope directed to the Comptroller-General of Patents, 25, Southampton-buildings, Chancery-lane, London.

This obtains for your invention a provisional protection for nine months, during which time you have the sole right to benefit by it. Before the nine months expire you must send the Comptroller what is called a *complete specification*,—this is nothing more than the old specification elaborated, for it should contain more details, and go more fully into the *way* of working the invention, and it should contain any improvements you may have made during the nine months which have elapsed since you sent in your first specification. You must be careful in your complete specification to explain every step in your invention fully and clearly, just as if you were describing it to a very ignorant workman, so that he could, after hearing your description, go away and make the article, or apply the process without having to come to you for further instructions. Start by stating the *object* of your invention, fully and clearly, using as many words as you like; then go on to state how you *effect* the object, giving every detail, and describing the best way you know of, taking care to omit nothing that can in any way assist in the perfect working of the invention.

During this elaborate description you will, of course, have mentioned many things which are neither new nor discovered by you, but which are necessary to the proper working out of your idea; so now is your time to state what *is* new in your invention, and you can best do this by saying, "This or that, though necessary to the working out of my invention, I do not claim as new"; and then go on to say, "But what I *do* claim is so-and-so," stating exactly what you *do* claim as new. Here, again, a glance at some of the Patent-office publications will assist you, as you will see the style in which specifications are written. Frame your own on the same model. The fee payable on the grant of a complete specification is £3; this, together with the fee of £1 already paid by you, makes £4 in all, and this represents all the fees you have to pay to obtain your patent. Four years after the grant of your patent you will be called upon to pay 10*l.*, or you will lose your right. 10*l.* a year is also payable for seven years after this, then 15*l.* a year till the ninth year, then 20*l.* till the thirteenth year; but, of course, none of these fees are payable should you not think it worth your while to keep up the patent after the four years. These duties may, if you prefer it, be paid in one lump sum.

It only remains to add that when the complete specification has been granted, the comptroller advertises the acceptance of the provisional and complete specifications, and informs the public that these documents will be open to inspection for two months. This is to give an opportunity to any one to file a declaration opposing the grant of the Letters Patent on some valid ground, for example, that your invention has already been patented in this country. The opposition takes the form of an action, the Comptroller sitting as judge, there being an appeal from his decision to "The Law Officer."

You can make yourself pretty safe with regard to any chance of opposition by making a search

in the lists of patents contained in the carefully-compiled books at the Patent Office, and which are supplied to most large towns by the Patent Office; indeed it is always wise to make such a search, so that you may feel sure that your idea has not struck somebody else, who has been first in the field and has got his patent out.

THE NEW RIVER AND A SEVENTEENTH-CENTURY "PROMOTER."

Cob.—"I dwell, sir, at the sign of the Water Tankard, hard by the Green Lattice."—*Every Man in his Humour*, III., 3.*

On June 19 last, in one of our reviews, "Architecture at the Royal Academy," we noticed Mr. J. Crowther's excellent water-colour drawing, No. 1,862, of the interior of the New River Company's "Oak Room," at Clerkenwell, and we published last week an illustration from Mr. Crowther's picture. The room in question appertains to the older portion of that Company's offices at the New River Head, in St. James's parish. It was fitted up *temp.* William III. by the then clerk to the company, one John Grene, who had married Elizabeth, daughter of Sir William, son and heir of its founder, Sir Hugh Myddelton. The wood-carving, as we said, is believed to be, and very possibly is, the workmanship of Grinling Gibbons. The decorated ceiling of an adjoining chamber, which is known to have been ornamented by Grene at the same time, bears date 1693. In this chamber is deposited an interesting model, to scale, of the London area which is covered by the company's system. The model was made as an exhibit in the Hydraulic and Water-supply Section of the recent Health Exhibition at South Kensington. The original premises, considerably altered and enlarged from time to time, were formerly occupied, it is said, by Myddelton himself. Since his day it was customary for the chief officers to reside here,—one of them being Robert Mylne, the architect and civil engineer, to whom we will presently advert. Hollar's small etchings of 1665 are doubtlessly familiar to some of our readers. Of the house in Myddelton's time,—of two stories, and a high roof with attic, and having a range of four columns on the ground-floor,—there is a good view from the north, then open land, by Antonio Canaletto,† 1753, engraved by Stevens. In the Crace Collection, British Museum, are T. H. Shepherd's water-colour paintings of 1852, showing this house as it appeared in 1689, and the new house as in 1851. Certain private and the public collections include many similar views. In the Company's court-room hangs a large print of their buildings in 1720, depicting the old offices, the basin, pond, and works. In the foreground is a railed-in reservoir which now occupies the middle of Claremont-square, Pentonville. The "outer pond," as it was termed, which, in form of a crescent, lay next northwards of the basin or head (since enlarged, lined with brick, &c.), and from which it was formerly separated by a lofty wall, has been replaced by filtering beds. But one may yet see the actual mound, close to the arched opening from the river into the basin, at which Myddelton stood with legitimate pride on Michaelmas Day, 1613. In the presence of Lord Mayor Sir John Swinnerton; his own brother Thomas, who, that same day had been chosen Lord Mayor-elect; together with other worthy company, the generous stream from the Chadwell and Amwell springs for the first time "ran gallantly," as Stow, in exultant mood relates, "into the cistern, drums and trumpets sounding in triumphal manner, and a brave peal of chambers gave full issue to the intended entertainment." That event is commemorated in George Bickham's print. The cistern had been a ducking-pond—"an open, idell pool," says Maitland. Moreover, the basement storey still remains of the ancient "wheel house," whose tower, that once carried a wind sail, forms so conspicuous an object in the earlier views by Chatelain, Woodward, Bowles, R. Green, and other artists, of the open country which then stretched beyond Spa and Coldbath Fields and Clerkenwell-green. The Head lies 82 ft. above the Thames.

Robert Mylne, F.R.S., the architect in preference to Gwyn of old Blackfriars Bridge,‡ and of "Almack's," since Willis's Rooms, in St. James's, was for several years surveyor—"Architect and Paymaster of the Works"—to the Dean and Chapter of St. Paul's, as well as to the New River Company. Mylne, to whom we owe the ever memorable "Si monumentum requiris, circumspice," died, aged seventy-eight, on 5th May, 1811, and was buried in the cathedral crypt. There, ten years later, John Rennie, who designed London, Southwark, and Waterloo bridges, was laid by his side. In 1782 he restored, as the engineer's house, the buildings of 1613, and rebuilt, in Dorset-street, Blackfriars, the old offices which, with voluminous records, were burnt on November 24, 1769. The Company used to hold their earlier meetings in taverns. The Blackfriars offices were let, *circa* 1820, to the City Gas Company. Robert Mylne's son, R. Chadwell Mylne, F.R.S., born 1781, succeeded to his father in the New River Company's service; and continued to hold office until, as we gather, his death at Amwell, in December, 1853. He it was who designed and built the engine-house and new machinery at New River Head, together with that by the extensive subsidence beds and reservoirs at Stoke Newington. He was buried in the family vault in St. John-the-Baptist churchyard, Great Amwell, where the epitaph says that for "upwards of half a century he had the care and management of the works of the New River, and the same period was Surveyor to the Stationers' Company."

Our rapid age of multifarious and eager enterprise cannot easily realise the extent and nature of the obstacles that well-nigh prevented Myddelton from accomplishing his great work. In Queen Elizabeth's reign an enabling Act had passed (1580) whereunder the citizens were empowered to bring supplies of water from the Hertfordshire springs. They made no move in the matter. Householders rested content with their apprentice's tankards, pumps, wells, and running conduits; and with one or two "Water Houses," such as Peter Maurice's at London Bridge (1582) and Bevis Bulmer's, near to Queenhithe (1594), which supplied but limited areas. They proved to be equally supine after the passing of a statute to the like intent in 3 James I., and an explaining Act of the following year. Sir Hugh then, in 1609, applied himself to the task, buying the City's interest in the undertaking. Thwarted in every direction, and violently opposed by the landlords along his route, he was almost a broken man when he had carried his works along the Lea valley past Theobald's and Chase wood to Enfield. Having in vain sought help from the Common Council, he turned to the King. James agreed to contribute one-half, being 7,437*l.* 4s. 11½d. of the expenses, taking in recompense one moiety, or nineteen shares of the estate. This was ratified on May 2, 1612. Hence the designation of King's Shares. In 1619, Myddelton, for 100*l.* a year to him and his heirs, made over his property in the venture to a company incorporated in that year, whereof he was nominated first governor, the Sovereign being precluded from taking active part in the management. A first dividend of 11*l.* 9s. 1d. per share was declared in 1633, the next dividend was but 3*l.* 4s. 2d., and inasmuch as in lieu of a third profit it was contemplated to make a call, King Charles I. took alarm, and offered to exchange his holding for an annual charge of 500*l.* upon the net proceeds. That charge was afterwards settled by William III. upon his friend the Earl of Albemarle for ever—as Hatton avers he is credibly assured. Upon the re-conveyance (1636) the governors sub-divided the King's moiety into thirty-six shares, and made a like sub-division of the remainder, that is to say, of the Adventurer's shares. These, in Hatton's time (1708) were assessed at 4,500 gs. each. The high premiums to which the stock has since attained will in all likelihood advance to a higher sum still, since some twenty years hence a large amount of rack rentals derived from the neighbourhood will fall in to the proprietors. The dividend on each freehold share for last year exceeded 2,600*l.* Myddelton, who, it seems, did not the while neglect his trade as a goldsmith in Basinghall-street, was knighted by the King, and in 1622 created a baronet, with remission from the usual fees. Two years before he had succeeded in reclaiming the inlet of Brading harbour, Isle of Wight, from the sea. In 1624 his superintendence ceased, and through neglect the works were gradually destroyed by the sea. In 1617 he enriched himself by clearing water from some lead and silver mines which he leased near to Plynlymmon. The sixth son of Richard, of Galchhill, governor of Denbigh Castle and scion of a good old Welsh stock, he died, according to some accounts, on December 10, 1631, by no means, as is commonly reputed, a poor man; though applications for aid were subsequently preferred to the company by his kindred. On December 21, 1631, his widow and executor proved his will, in London. Janssen painted his portrait—a gift from the widow to the Goldsmiths' Company. To his memory Robert Mylne set up, in 1800, a pedestal and votive urn on the larger islet in the stream at Amwell, and marble statues have been erected in the Royal Exchange (by Carew), and at Islington-green. The latter, by Thomas, and given by Sir M. Peto, was uncovered by Mr. Gladstone, on July 26, 1862. They who incline to poetry may like to be reminded that the poem of "Amwell," written by the Quaker, John Scott (born 1730), of Ware, contains numerous allusions to the New River as it flows in placid meandering course for about forty miles into London.

* Jonson's comedy gave a generic name to the water-bearers: they resorted to an alley in Broadway, Ludgate-hill, named, after them, Cobs'-court.

† We notice that since about six months ago his name on the titles of his pictures in the National Gallery has been changed into, as it strictly should be, Canale.

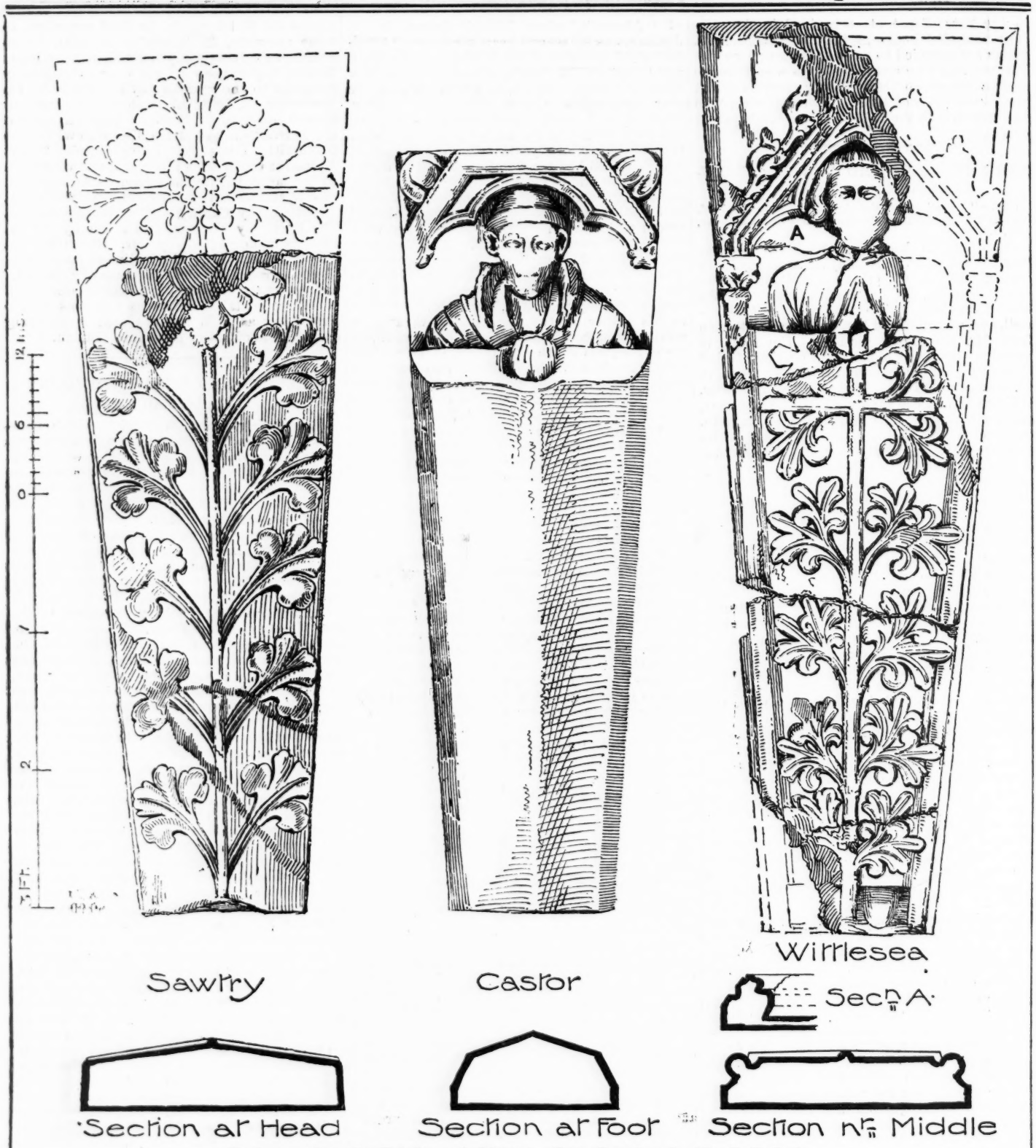
‡ Demolished in 1864. We read that some of its stones were used in constructing the river-side terrace at Kingston-on-Thames.

HESTON AND ISLEWORTH MAIN SEWERAGE.

The drainage of this district, which comprises the towns of Hounslow, Isleworth, and Heston, is proceeding apace. The works will cost about 80,000*l.*, and were commenced in August, 1887. The scheme is that of Mr. Walter B. Bromley, Engineer to the Local Board, and we believe that it was mainly through its presentation at the Government inquiry held at Kingston-on-Thames, five years ago, that the district of Heston and Isleworth was allowed to be severed from the Lower Thames Valley Main Sewerage Board.

The main sewers, which are being laid by Mr. Jas. Hayward, of Eastbourne, consist of 30-in. pipes. The population is about 25,000, and the sewers are all calculated to discharge 45 gallons per head of the population in twelve hours, being the quantity adopted by the Lower Thames Valley Board. The scheme is being carried out is on the "separate system," the sewage being taken to the land and the rain water to the watercourses and river. This system has been adopted so as to lessen the first cost of the sewers, and to reduce the after or annual expense to a minimum. The sewers will take all soil, sink, stable, and yard or other water, and the surface-water drains will carry off the rain-water. The district is divided into two parts, the high and the low, or water-logged portion. The high-level outfall sewer is calculated for 66,000 head of population, and the low-level for 20,000, being a total of 86,000 or three and a half times the present number of inhabitants. The high level is the Heston and Hounslow portion, and the water-logged that of Isleworth, Brentford End, and St. Margaret's. From the high-level the sewage will run by gravitation to the outfall at Mogden, but from the low-level it will be pumped up by Shone's pneumatic ejectors .There are twenty-six miles of sewers, and the pipes are Hassall's safety joint, which are being most successfully laid in water, and without which the work could not be done without sub-soil drains, so much water being met with. At the outfall the sewage will be treated by chemical precipitation, and the works, which are being constructed by Messrs. B. Cooke & Co., of Battersea, are almost complete. The sewers will probably be finished in six months' time, and the works will be ready for house-connexions in about eighteen months.

Metallurgical Department, King's College, Strand, London.—We are asked to state that there are three or four free admissions to the Laboratory and to the lectures obtainable through the City and Guilds of London Institute for the Promotion of Technical Education. Inquiries may be addressed direct to Prof. Huntington, at King's College. Work commences this week. The course of lectures is designed for all those who in any way have to do practically with the applications of metals. It treats of the principles of the methods by which metals are obtained from their ores, and the means by which they are rendered suitable for the various requirements of the arts. Special attention will be devoted to the metallurgical requirements for the Technological Examinations of the City and Guilds of London Institute in metal plate work, plumbing, iron and steel, and for the Whitworth Scholarships and Science and Art Department Exhibitions. We are informed that the instruction given to each student in the Laboratory is regulated by his special requirements.



Tombstones from the Peterborough District.—From Drawings by Mr. J. T. Irvine.

TOMBSTONES NEAR PETERBOROUGH.

The accompanying drawings of tombstones are traced from careful pencil drawings made on the spot by Mr. Irvine, the present Clerk of Works at Peterborough Cathedral. They are examples found in that part of the country, and two of them present a peculiarity of design which will be at once recognised, and which seems to be characteristic of the district; the recumbent figure is seen as if covered by a mantle, which conceals all but the head and shoulders. In the example from Castor Church (south transept) the covered portion is left perfectly plain; in that from Wittlesea St. Mary, it is decorated with a fine flowering cross. In this example, it will be seen, the feet (only one of which remains) are also shown protruding from the bottom of the coverlet, as we may call it.

We saw the sketches when looking over the work at Peterborough with Mr. Irvine recently, and thought them of sufficient interest to ask leave to reproduce them, which Mr. Irvine readily gave. His drawings were in pencil, and would not have reproduced satisfactorily; we have accordingly had tracings made from them, and the sections are drawn out to scale from Mr. Irvine's figured profiles.

Illustrations.

HOUSE ON THE SEVERN.

THIS view and plan of a small riverside house, by Mr. C. E. Mallows, is from a drawing by the architect, which was exhibited at the Royal Academy this year.

The house is about to be built on an unusually picturesque site near Upton, Worcestershire. The principal feature of the plan is the large hall and staircase, around which are grouped the reception-rooms. The upper floors contain fourteen bed and dressing rooms, bath, lavatories, and stores for linen, &c.

Local stone of a reddish colour will be used for the principal fronts, the green slates for the roofs; tile hangings and red brick for other parts.

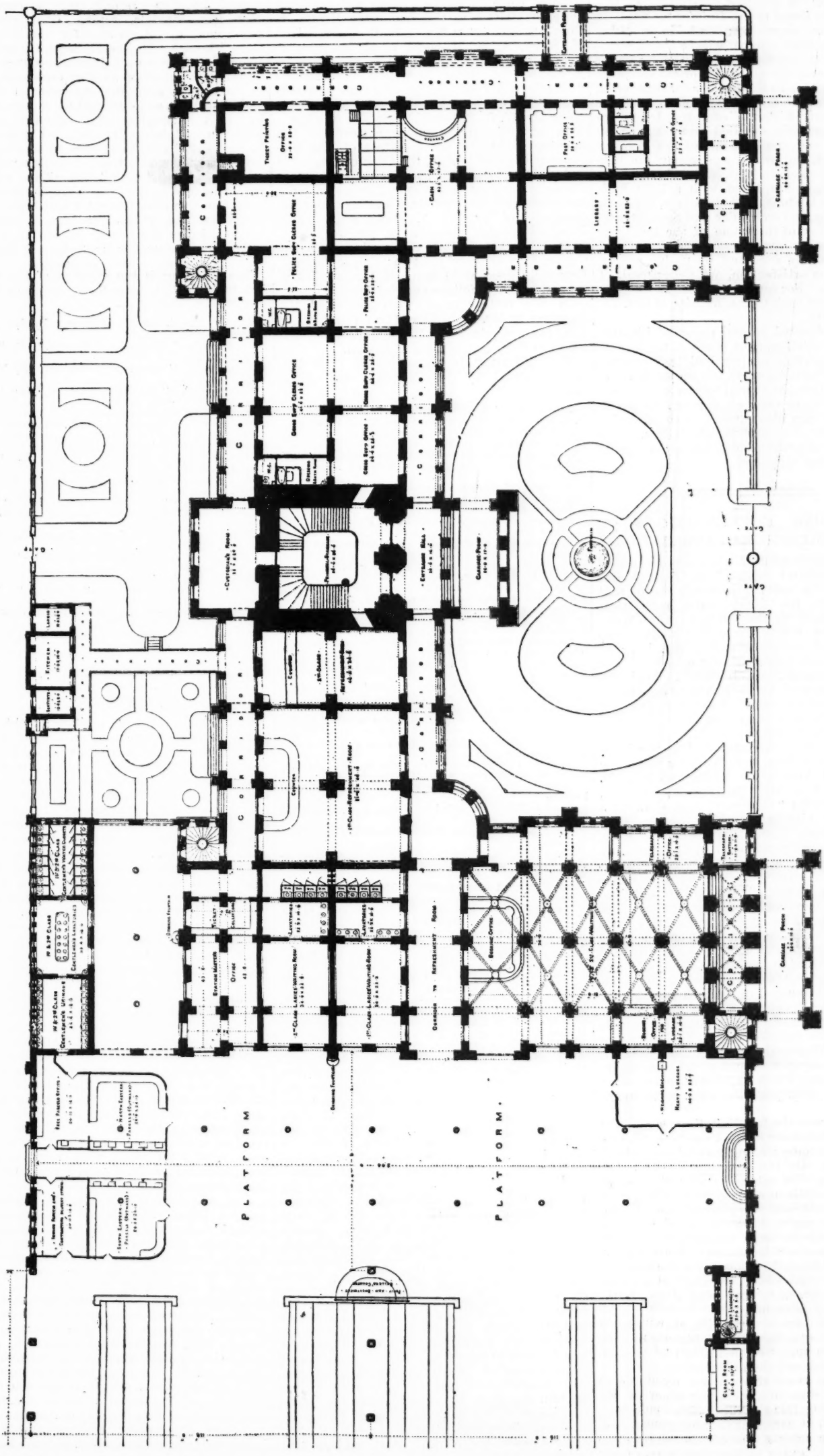
We give a reproduction of the drawing on a larger scale than the architectural importance of the house itself might seem to warrant, in justice to the very artistic spirit of the drawing as a whole.

GREAT INDIAN PENINSULAR RAILWAY TERMINAL BUILDINGS, BOMBAY.

We give this week the principal elevation and views of different portions of this building, one of the largest which has been erected in India from the designs of an English architect.

In the *Builder* for October 23, 1886, we gave a view of the large Waiting Hall, and of the entrance-corridor to it, and some illustrations of the sculptural decorations; and in the same number we gave a pretty long description of the building and the materials employed, from information furnished by the architect, Mr. F. W. Stevens, from whose designs and under whose supervision the buildings were commenced in 1879.

We have little to add to the description given along with our former illustrations. The figure sculpture has been executed in London by Messrs. Earp & Son, and includes a colossal figure of "Progress" on the summit of the dome (seen in one of the views). The large gables on the south and west sides are surmounted by groups on pedestals representing Engineering, Commerce, and Agriculture, and the statue of the Queen-Empress has been placed



Great Indian Peninsular Railway Terminal Buildings, Bombay.—Plan.

under the canopy below the large clock of the central gable. A separate illustration of this statue will be found in the *Builder* for Sept. 10 of last year, page 362; and in a lithograph in the same number will be found reproductions, from photographs, of the figure of "Progress," and the other allegorical sculpture above referred to. In the *Builder* for October 23, 1886, we gave also a lithograph of some of the decorative carved detail, executed by native carvers from models supplied and designed by Mr. Gomez and the students of the Bombay School of Art, and which are among the best portions of the decorative work.

The buildings are faced with a light buff-coloured Coorla stone, with dressings, cornices, mouldings, &c., in Porebunder and Seoni stones.

The total cost of the whole of the buildings was about twenty-seven lacs of rupees. All the work was entirely executed by native labour, entirely to the satisfaction, we understand, of the architect. For further particulars we must refer the reader back to the *Builder* of Oct. 23, 1886, page 608.

We have devoted several pages of illustrations to this building, as it is one of the largest and most important modern buildings erected under European influence in the Indian Empire, and we have thought it well to give our readers the opportunity to form an opinion, as far as may be done from illustrations, as to the architectural merits of a building which has, apparently, received great admiration in the regions of Anglo-Indian criticism.

THE OPENING *CONVERSAZIONE* OF THE ARCHITECTURAL ASSOCIATION.

The commencement of what may be termed the "architectural session" in London was heralded by the opening *conversazione* of that vigorous body, the Architectural Association, which took place on the 5th inst., at the Westminster Town Hall. There was a numerous attendance of members and ladies, but the rooms were not inconveniently crowded. The energetic President, Mr. Herbert D. Appleton, F.R.I.B.A., assisted by the honorary secretaries and the committee, received the company, for whose delectation a large number of drawings and other exhibits were on view.

Among the drawings exhibited in the large room on the first floor, were those for which the Architectural Association Medal and 10*l.* 10s. were awarded to Mr. Banister F. Fletcher, bearing the motto "Crowbery," and showing a design for stables to a country house. The design was Early French Renaissance in style, simply and severely treated, and the buildings were placed round a courtyard. The drawings by Mr. E. L. Lutyens, bearing the motto "Simplex et Prudens," and which obtained "honourable mention," were also on view. For the Architectural Union Company's Prize there were two competitors, the first place being awarded to Mr. Sidney Tugwell for his measured drawings, bearing the motto "Yorkshire." For the Neale Prize there were five competitors. The prize was awarded to Mr. S. Greenslade for his admirable drawings of Elm Church, near Wisbech. In the same competition honourable mentions were awarded to Mr. H. Tooley (for drawings of Worstead Church, Norfolk) and Mr. A. C. Walker (for drawings of Barfreston Church, Kent). The Edis Prize attracted seven competitors. The prize was awarded to Mr. A. Gladding.

Judging from the fact that there were eight competitors for the "Essay Prize," the literary faculty seems to be making way in the ranks of the members. On the table was the MS. of an essay bearing the motto "Olaf," by Mr. H. Tooley. It consists of a description of Worstead Church, Norfolk, and was awarded the Association's silver medal and 10*l.* 10s. An extra bronze medal and 5*l.* 5s. were awarded to Mr. W. Wonnacott (motto "Jessamine") for his essay on "Timber Roofs." Honourable mention was awarded to the essay bearing the motto "Saxon," by Mr. A. A. Cox, being a description of Canterbury Cathedral.

Mr. J. L. Robinson, of Dublin, contributed a series of photographs taken by himself in illustration of the recent excursion of the Association to Matlock and the neighbourhood.

In the next room there was a collection of water-colour drawings, including some by Mr. W. Medlycott Duke (Aldwinckle Travelling Student, 1887). Mr. Duke's productions were very good,—notably a view of the market-place at Verona, and a view in Rouen with the Cathedral in the distance. Mr. A. H. Hart also contributed some exceedingly good water-colours. Other exhibitors in this line were Messrs. R. Phené Spiers, Aston Webb, H. O. Cresswell, E. H. Selby, A. B. Mitchell, C. E. Mallows, P. Thornhill, Francis Miller, and Gerald Horsley. A number of plates from the Association's "Sketch-book" and designs for the "Sketch-book" title-page (the successful competitor being Mr. W. G. B. Lewis), were also on view.

In an adjoining room were exhibited the drawings made by the members of the Elementary Class of Design, the Class of Ornament and Colour Decoration, and the Elementary Class of Ornament and Colour Decoration,—the last-named being a new class started under the presidency of Mr. Cole A. Adams, and remarkable for the high character of the work done. In fact, the best exhibits of drawings from the Classes were made by the two "Colour Classes." Especially good were some of the studies of natural colour in foliage and feathers.

In the further room were exhibited the drawings by Mr. D. J. Blow (first prize), C. O. King (second prize), and J. E. Jefferson (honourable mention) in the Class of Design.

The following is the complete prize list, as announced by the President during the evening:—

Architectural Association Studentship.—Awarded to Mr. D. J. Blow; Second prize awarded to Mr. R. D. Warry.
Aldwinckle Travelling Studentship.—Awarded to Mr. H. V. Lanchester.
Architectural Association Medal.—Awarded to Mr. B. F. Fletcher. Honourable Mention made of Mr. E. L. Lutyens.
Architectural Union Company's Prize.—Awarded to Mr. S. Tugwell (Second prize not awarded).
Blashill Prize.—No competitors.
Cates Prize.—Awarded to Mr. A. W. Hennings.
Ernest Turner Prize.—Awarded to Mr. A. W. Jarvis.
Elementary Class of Design.—Section I.—First prize awarded to Mr. A. E. Habershon. Second prize to Mr. P. G. Eade. Honourable mention made of Messrs. H. A. Saul and C. H. Strange. Section II.—First prize awarded to Mr. A. W. Jarvis. Second prize to Mr. C. Bywater. Honourable Mention made of Mr. R. A. J. Bidwell.
Elementary Class of Construction.—First prize awarded to Mr. A. W. Cleaver. Second prize to Mr. F. H. Greenaway.
Elementary Class of Ornament and Colour Decoration.—First prize awarded to Mr. C. S. Haywood; Second prize to Mr. V. T. Jones; Class prize awarded to Mr. V. T. Jones.
Class of Design.—First prize awarded to Mr. D. J. Blow; Second prize to Mr. C. O. King; Honourable Mention made of Mr. J. E. Jefferson.
Colour Decoration Class.—First prize awarded to Mr. H. V. Lanchester. Honourable Mention made of Mr. C. J. L. de Beaupré. Time Sketch prize awarded to Mr. C. J. L. de Beaupré.
Class of Construction.—First prize awarded to Mr. O. Oertel; Second prize to Mr. H. Ermrich.
Advanced Class of Construction.—Awarded to Mr. O. Fleming.
Quantity Class.—Awarded to Messrs. A. O. Breeds and G. Harvey (æq.).
Sketch Book Title-page Prize.—Awarded to Mr. W. G. B. Lewis.
Neale Prize.—Awarded to Mr. S. Greenslade.—Honourable Mention made of Messrs. H. Tooley and A. C. Walker.
Edis Prize.—Awarded to Mr. A. Gladding.
Book Plate Prize.—Not awarded.
Essay Prize (with medal and 10*l.* 10).—Awarded to Mr. H. Tooley. Bronze Medal and 5*l.* 5s. awarded to Mr. W. Wonnacott. Honourable Mention made of Mr. A. A. Cox.
Lectures on History of Architecture.—First and Second prizes divided between Messrs. F. M. Elgood and O. Fleming (æq.). Third prize awarded to E. Carless. Highly commended: Messrs. W. Pywell and J. Gethin.
Lectures on Construction.—First prize awarded to Mr. R. F. Taylor; Second prize to Mr. A. C. Walker. Third prize to Mr. H. E. Matthews. Honourable mention made of Messrs. E. Carless and L. J. Veit.

In the large hall, on the ground-floor, there were a number of exhibits of art manufactures, &c. Amongst them we may mention some very good "art tiles" by Messrs. De Morgan & Co., of Great Marlborough-street. Near to these was some delicate wrought iron work by Mr. Wilde. Messrs. Campbell, Smith, & Co. exhibited some excellent wall-decorations designed by Mr. Owen W. Davis, intended for the decoration of a house at Caen, in the Pompeian style. The same firm also exhibited the drawings of the decorative work carried out by them at the Alhambra, Leicester-square. Messrs. Hindley & Co. exhibited a good chimney-piece, &c., in white wood, with ingle-nook and seats forming part of the design. Messrs. George Wright & Sons exhibited a pine-wood mantel-piece and over-mantel decorated in high relief with moulded ornament formed of a new material, which is neither *carton-pierre*, nor lincrusta, nor plaster of any kind. It is tough and difficult to injure, and a fairly good degree of sharpness of line is attainable by its use. This mantel-piece was *en suite* with a new pattern dog-grate in wrought-iron, the jambs and hearth of the fireplace being of Broughton tiles containing sepia-painted panels illustrating the "Devil's Bridge" and other subjects after Turner. The same firm exhibited a good walnut mantel-piece and over-mantel, with stove, &c., *en suite*, and a couple of cast-iron mantels copied from prevailing wood models, and suitable for use in "Queen Anne" houses. Messrs. Jeffrey & Co. exhibited some of their new wall decorations, including a design with panels of Persian ornament, stated to have been suggested by work at the Taj Mahal at Agra, and designed for Messrs. Jeffrey by Mr. A. F. Brophy. The same firm also exhibited a wall decoration designed by Mr. Lewis F. Day, showing a frieze 30 in. in depth; in the Arabesque foliage of this design the emblematic subjects "Earth," "Air," "Fire," and "Water" are introduced in the form of medallions. The same firm also exhibited a "Free Classic" decoration designed by Mr. Hampden W. Pratt, and another design for a wall decoration, entitled "The Woodpecker," by Mr. Sydney G. Mawson.

The following is the syllabus of the papers, &c., to be read at the ordinary meetings for the new Session 1888-89:—

October 19.—President's Address. By Mr. H. D. Appleton.
November 2.—"Elizabeth and Victoria." By Mr. J. A. Gotch.
November 16.—"Arches and Vaulting." By Mr. A. T. Walmisley.
November 30.—"The Development of Irish Architecture from the early Keltic work to the Eighteenth Century." By Mr. J. L. Robinson, A.R.H.A.
December 14.—"Symbolism." Mr. W. Doubleday.
January 4, 1889.—"London Street Architecture, as it is and as it might be." By Mr. F. Masey.
January 18.—"Architecture of Support and Architecture of Equipoise." By Mr. E. Radford.
February 1.—"Artificial Illumination." By Mr. J. Slater, B.A.
February 15.—"The English Classic Revival of the Seventeenth and Eighteenth Centuries." By Mr. J. M. Brydon.
March 1.—"The Life of an old Parish Church." By Mr. J. T. Micklethwaite, F.S.A.
March 15.—"Architecture in Oxfordshire." By Mr. W. A. Pite.
April 5.—Members' Soirée.
April 19.—"Sussex and its Architecture." By Mr. Lacy W. Ridge. Nomination of officers.
May 3.—"Wrought Iron Door Furniture (Ecclesiastical)." By Mr. J. Starkie Gardner.
May 17.—"The Travelling Student's Notes." By Mr. D. J. Blow. Election of officers.

THE LELAND CLUB.

The fourth autumnal meeting of this Antiquarian Society commenced on Tuesday, the 2nd inst., in the City of London, when a long visit was paid to Christ's Hospital, Mr. Henry Legg, of the Architect's office, conducting the members over the establishment, explaining its history and pointing out the few remains of the famous Grey Friars Church in the cloisters of the present building, for the most part the work of Sir Christopher Wren.

Visits followed to the Cutlers' and Haberdashers' Halls, where the respective Masters kindly exhibited the plate, and explained the history and nature of their companies.

The churchyard of St. Alphege, containing a portion of the Roman wall, and the church itself, with its grand Early English arch in the present tower, were then inspected, Mr. John Reynolds giving an account of the monastic buildings with which this part of the fabric had been connected when Sion College existed.

The next day, Wednesday, the 3rd inst., the members proceeded to Saffron Walden, and were met by the ex-Mayor, Mr. Joseph Bell, J.P.; Mr. Clarke, F.S.A.; and the Vicar, the Rev. T. Stevens, M.A. At the fine Perpendicular church, Mr. Stevens gave a short but interesting account of its history, pointing out its peculiarities of architecture at the same time. The remains of the keep of the Castle, having portions of Saxon work within its walls, were next inspected and described by Mr. Clarke, F.S.A.; and then the museum, admirably arranged and containing a fine collection of Pre-historic implements, Ancient British and Roman remains, was examined under the guidance of the curator. Afterwards some of the party went to the Roman tumuli at Beallow, whilst the remainder visited the rare collection of pictures and other works of art and of natural history at the residence of Mr. Josiah Clarke, outside the Old Town. After examining several of the ancient houses in the town under the guidance of Mr. Joseph Bell, the members proceeded, by the permission of Lord Braybrooke, to Audley End, that famous Jacobean mansion being thrown open for their inspection. On their return to Saffron Walden, and by the invitation of Mrs. Gibson, they examined the collection of Ancient British and Saxon objects of art and implements found in the Saxon cemetery in Mrs. Gibson's beautiful grounds, upon its exploration a few years since.

On Thursday, the 4th, Cambridge was the scene of the Club's proceedings, the "Itinerary" for which was drawn out by Mr. John E. Foster. On arriving at Cambridge, the Archæological Museum was examined. Mr. Foster (in the unavoidable absence of the Rev. G. F. Browne, Disney Professor of Archæology) pointed out the most striking objects of interest, and calling especial attention to the Roman remains found in the neighbourhood, and to the enormous models in plaster of the idols lately brought over from Central America, bearing in many of the sculptured faces and forms upon them a striking affinity to the Assyrian and Egyptian works of art in the British Museum. At 11.30 Mr. John Willis Clarke, editor of the "Architectural History of the University of Cambridge," gave a lecture, by the permission of the college authorities, in the hall of Queen's College, which was admirably illustrated by diagrams and drawings made by the late Professor Willis, an uncle of the lecturer, the subject being "College Architecture." After the discourse, which was received with great applause, the members were conducted round the college by permission of the President and Mrs. Phillips, the College plate being also exhibited. Afterwards the Round Church and the valuable old plate at Christ's College was visited and inspected; and then, arriving at King's College about 2.40 p.m., the members were met by Professor Middleton, Slade Professor of Fine Art, who pointed out the principal architectural features of that noble building, explaining its history whilst escorting the party round its many interesting chapels. Leaving at 3.30 the members proceeded to Corpus Christi College, where the Master, the Rev. Dr. Perowne, took them to the library and discoursed upon its contents, especially pointing out its beautifully-illuminated Saxon and other MSS., calling especial attention to the MS. letter, in Latin, of Edward VI. to his step-mother, Queen Katharine Parr.

After reviewing the most ancient part of the college buildings, and the curious old plate, the Rev. Dr. Perowne took the party to the Saxon, or, as some prefer to denominate it, the "pre-Norman Tower" of the Church of St. Benedict, where the Vicar showed the visitors through the ancient edifice, and commented on its history and foundation. This brought the day's pleasant proceedings to a close, and the return to London was made soon afterwards by the members of the Club.

The next day, Friday, was dedicated to a visit to Winchester, where, on arriving about 11 a.m., a party of at least thirty ladies and gentlemen proceeded under the escort of Messrs. Wright and Reynolds to the Cathedral, which, under the guidance of the Rev. Dr. Kitchin, Dean of Winchester, was thoroughly inspected. A short visit was made to the grounds of the deanery and the remains of the Pilgrims' Hall, now used as a barn or general store-house, examined. After luncheon at the Royal Hotel, the party, led by the Dean, proceeded to the College School, where the head-master, the Rev. Dr. Fearon, received and conducted the members through the principal portions of the famous building, explaining and pointing out the oldest features of William of Wykeham's work; afterwards, led by the bursar, Mr. T. F. Kirby, the audit-room, cloister, and chapel were visited, the latter gentleman then conducting the party by the College Meads to Saint Cross, where several partook of the ancient dole of bread and beer before leaving that venerable and once important monastic establishment.

At the railway station, on the departure of the members of the Leland Club for London and elsewhere, Mr. Williams, of Clifton, proposed a vote of thanks to Messrs. Wright and Reynolds for their services to the members all through the week's proceedings, and which being responded to, heartily though briefly, by those gentlemen, the fourth annual London and country meeting of the Leland Club came to an end.

EXTENSION OF WATERWORKS, ABERDEEN.

The attention of the Town Council of Aberdeen having been directed by their engineer, Mr. Boulton, to the scarcity of water, principally in the high-lying districts of the town, in 1883 a remit was obtained to call in Mr. James M. Gale, the engineer for the Glasgow Water Commissioners, to advise generally as to the best means of improving the supply. In his report, among other things, Mr. Gale advised the erection of a new pumping-engine station, two new service reservoirs, with the necessary connecting and distributing mains, and the extension of the intake. These works are now almost completed.

The original reservoir for the low service, at Mannofield, intended to hold about six million gallons, has now been supplemented by the construction of an additional reservoir, closely adjoining to the west. The new reservoir is now finished. It is circular in shape, 370 ft. in diameter, and holds 18 ft. of water, which means a capacity of twelve million gallons, and is equivalent to about two days' supply for the whole city. The average level will be about 160 ft. above high-water mark.

The walls of the new reservoir are formed of granite ashlar masonry, built one header to every two stretchers, the headers being 30 in. long and 18 in. in breadth of bed, and the stretchers 3 ft. long and 12 in. in the breadth of bed, backed with heavy rubble masonry, all built in cement mortar in the proportion of 2 parts of sand to 1 of cement. The walls are surrounded by a lining of clay puddle 12 in. thick.

The bottom of the reservoir is of concrete, 13 in. thick, and has been put down in three layers. The bottom layer is 6 to 1 and the middle layer 5 to 1, both these layers being 6 in. thick. They are finished on the top with a layer of cement plaster 1 in. thick, in the proportion of 1 to 1. These layers are arranged in panels about 36 ft. square, this being an ordinary day's work for the squad of men employed. A squad of men is kept working on all three layers, so that three panels a day are being put in. The panels are so designed that the joints in each layer are in the middle of the panel, above or below. The walls are designed in such a way that the reservoir may be covered over at any future time if considered desirable.

In connexion with the reservoir there is a straining-chamber, 20 ft. square and 20 ft. deep, and a gauging-well with a gauging-weir 10 ft. wide. The connecting pipes between the new and the old reservoirs and the outlet-pipe to serve the city are so arranged as to supply the town in three different ways—either from each reservoir separately, from both in conjunction, or by direct supply from the aqueduct. A further arrangement has also been made, whereby when the River Dee (whence the town's supply is derived) is in flood and the water discoloured, the new reservoir can be used as a settling pond for the old one. The total expense of this new reservoir, exclusive of the cost of site, will be about 15,000*l.*

The Slopefield Reservoir for the mid-level service has been planned on similar lines. It measures 270 ft. in diameter, with 18 ft. depth of water. It will be finished by the end of September, and will contain six million gallons of water. The level of this reservoir is 300 ft. above high-water mark at Aberdeen. The water will be used to supply the whole of the high-lying district within the Municipal boundary. The water for this reservoir will be pumped from the aqueduct at Cults, near which a steam pumping-station has recently been erected at a cost of 7,000*l.*, including both engines. The first engine is capable of raising half a million gallons in twelve hours. It is a horizontal compound surface-condensing engine on the tandem principle. The new engine, on the other hand, will have cylinders placed parallel, and will be worked by gearing. It is said to be capable of raising one million gallons in twelve hours to a height of 140 ft.,—being the difference of levels. The pumping main is about one mile in length and 20 in. in diameter, spigot and faucet, part with turned and bored joints, and part with lead joints. There is a special electrical indicator fitted up between the reservoir and the pumping-station to show the rise and fall of the water in the reservoir. In connexion with the new reservoir, new mains, about ten miles in length, and costing about 12,000*l.*, have been laid in the city. The cost of the Slopefield Reservoir, exclusive of site, will be about 9,000*l.*

The previous intake at Cairnton has been shifted 400 yards up the River Dee, with the object of ensuring a steady supply in times alike of frost and of drought. The Town Council have obtained power from Parliament to increase the supply from six million to eight million gallons a day, and the new intake will afford opportunities for taking in an ample supply irrespective of the weather.

It may be mentioned that the High Service Reservoir at Hillhead of Pitfodels (which is 400 ft. above sea-level and contains about half a million gallons) will be retained and fed by the old hydraulic pumping-machines at Morrison's Suspension Bridge, Cults. The whole of the new works have been designed by Mr. William Boulton, M.Inst.C.E., the Burgh Surveyor of Aberdeen, and have been carried out under the personal supervision of his chief assistant, Mr. A. Dyack, A.-M.Inst.C.E.

THE "NATIONAL STANDARD" THEATRE IN THE AUCTION MART.

The putting-up for sale of the National Standard Theatre, in Shoreditch, on Wednesday, under the will of the late Mr. John Douglas, brought together one of the largest audiences which have been seen at the Auction Mart for many years past. The sale was held in one of the large rooms at the Mart, and some time before the hour announced for its commencement every seat was occupied, and there was not even standing-room for the large numbers who were anxious to obtain admission. Amongst those present, the theatrical profession was largely represented. Sir J. W. Ellis, M.P., conducted the sale, and in an address of considerable length, described the property as one of the most valuable freeholds in the East-end of the Metropolis, observing that the theatre, which was one of the largest in London, was entirely rebuilt in the most substantial manner in the year 1867, and, as indicating its large dimensions, he stated that the auditorium afforded accommodation for 4,200 persons, realising, at popular prices, about 200*l.* The stage arrangements were also referred to, the autioneer observing that the stage was of exceptionally large dimensions, measuring upwards of 60 ft. square, and very lofty. Three houses and shops in Holywell-lane were included in the sale, these being used as dressing-rooms and store-rooms in connexion with the theatre; also two houses in George-street, forming an emergency exit from the pit. He announced that the Bishopsgate Hall was likewise included in the sale. It was stated to be approached from High-street, extending over the grand staircase to the theatre, and measuring about 73 ft. by 34 ft. It is capable of seating about 800 persons, has a stage and gallery, and suitable for use as a minor theatre or lecture room. The entire property forms a compact freehold block, and covers the extensive area of 17,100 ft. The auctioneer, in estimating the value of the property, reminded the company that they had to deal not only with the buildings themselves, but also with the freehold land upon which they stood, and he was enabled to say from a long experience, that freehold land in this part of Shoreditch was worth 3*l.* a foot, which would give 50,000*l.* as the value of the land alone. The biddings commenced by an offer of 20,000*l.*, and by successive advances 31,000*l.* was reached without any further offer, on which the auctioneer observed that it was not even the value of the land. The property was ultimately withdrawn, it being stated in the sale-room that the reserve price of the property was 63,000*l.*

LIGHT RAILWAYS.

At a meeting of the Society of Engineers, held at Westminster Town Hall, last week, Mr. A. T. Walmisley, President, in the chair, a paper was read on "Light Railways," by Mr. William Lawford, M.Inst.C.E.

The paper first drew attention to the fact that the subject was not a new one, having been brought before other scientific bodies about twenty years ago, and also that since that period not much appeared to have been done with light railways, in this country at least, and that amongst those that had been constructed, few, if any, had proved commercially successful. The author endeavoured to show the reasons for this, and contended that up to the present time they had scarcely had fair play shown them, and that greater facilities for construction should be granted by Act of Parliament. He then showed that, comparatively speaking, the so-called Railways Construction Facilities Act was not made much use of; the ordinary Act of Parliament, notwithstanding its additional cost, being evidently preferred.

The development of steam tramways and road railways was then brought forward, and the term "light railways" properly defined, and the latter was exemplified by a description of the Wotton Tramway constructed for the Duke of Buckingham and opened for traffic in 1871: the

traffic results on this line for the year 1887 were then given.

The author next introduced the subject of break of gauge, as many light railways have been made on less than the normal gauge of this country, which necessarily involved a break of gauge; this was exemplified in the case of the Festiniog Railway, which has a two-feet gauge: and the opinions of some engineers of eminence were given on the gauge question. Mention was also made of the actual difference in the cost of construction of a double line of mixed gauge (a line combining the 7 ft. 0 in. and the 4 ft. 8½ in. gauges) as against a double line of the 4 ft. 8½ in. gauge only, on a well-known suburban railway; and some interesting particulars upon the alteration of a gauge of eighty miles of open railway were alluded to, showing how this was accomplished without interfering with the traffic.

The suggestions of the Report of the Commission on the Depression of Trade was shown to have some bearing on this question, from the fact that light railways or steam tramways would be the means of greatly assisting the transport of agricultural produce generally, so as to bring it rapidly and cheaply to market, the assumption being that such districts as those alluded to might bear the expense of making and working a light railway, whilst the population was too sparse and too widely scattered to support a railway of heavy or ordinary construction. An American engineer's idea on this subject was then quoted to show how the traffic in this country was carried on, and how it ought to be carried on, and that we should not haul such a large proportion of non-paying loads as we are in the habit of doing.

The introduction of the bogie wagons would, no doubt, help largely to reduce working expenses on ordinary railways, and especially so on light railways. Moreover, such bogie wagons could run round very sharp curves without injury to the road-bed on which they ran. The Wolverton and Stony Stratford Steam Tramway was described, on which there are double bogie passenger cars running, carrying 134 passengers, the length of these cars being 48 ft. This is a narrow-gauge line, the rails being only 3 ft. 6 in. apart. After passing through Stony Stratford the line is extended to the village of Deanshanger as a road railway, the rails being laid on the waste space at the side of the road. Other light railways and steam tramways, either at work in this country or in course of construction, were then mentioned.

Certain light railways in Russia, known as the "Maltzeff" railways, were alluded to, but all that is known of them is that their cost is barely one-fifth per mile of the ordinary heavy lines in that country, and that they pay an annual surplus profit of 3¼ per cent. on the cost of construction.

The average cost of railways in the United States is said to be 6,000*l.* per mile; in England it is about 40,000*l.*; while a road or light railway can be constructed and equipped for from 4,000*l.* to 5,000*l.* per mile. Light, or secondary railways, as they are called in France, are constructed on the normal or 4 ft. 8½ in. gauge, at a cost of 4,800*l.* per mile, including equipment and all expenses. In Prussia, a light or road railway was constructed in 1864, gauge 4 ft. 8½ in., length twenty miles, cost 3,231*l.* per mile, including equipment. In Hungary, all railways are on the 4 ft. 8½ in. gauge. There are two classes of railways, the first class for main or important lines, the second class for poorer districts, which can be turned into first-class lines if the exigencies of traffic require it. These second-class lines have cost 6,450*l.* per mile, but as they were made when iron, materials, and labour were very expensive, they would now probably be made for about 5,000*l.* per mile. There were about 300 miles of second-class lines in Hungary some twelve years back, and fifty-eight miles of additional lines have also been made, at an average cost of 4,184*l.* per mile.

The conclusions arrived at were, that if light railways can be made to pay their promoters in other countries, why should they not do so in this? And the author gave it as his decided opinion they had not yet had fair play accorded to them.

Appointment.—At a meeting of the Newmarket Rural Sanitary Authority, on the 25th ult., the resignation of their Surveyor, Mr. William Fraser, was accepted with regret, on his being appointed Surveyer to the Cardiff Rural Sanitary Authority.

OBITUARY.

Mr. James Sellars, Architect.—The profession and general public will learn with great regret of the death of Mr. James Sellars, the well-known Glasgow architect,—and the designer of the Glasgow Exhibition,—which took place on the morning of Tuesday last. Mr. Sellars was essentially a Glasgow man, having been born in the city, and remained all his life professionally and residentially associated with it. He has been in failing health since before the completion of the Exhibition; and, although the news has come upon the public as entirely a surprise, the consummation had for some time been too surely foreseen by his own circle of friends. Born in 1843, Mr. Sellars, when no more than a lad, entered the office of Mr. Hugh Barclay, architect, some years thereafter gravitating to that of Mr. Campbell Douglas, with whom, after a time, he entered into a partnership which has lasted to the close, and all along enjoyed a large measure of professional success. Besides the Exhibition, the name of the deceased architect is associated with the St. Andrew's Hall, the New Club, West George-street; the *Glasgow Herald* Buildings, Buchanan-street; the warehouse (in terra-cotta) of Messrs. Wylie & Lochead, also in Buchanan-street; and with numerous other public and private buildings of merit in and around Glasgow. He was President of the Institute of Architects, Glasgow; and for some years a member of the Council controlling the Institute of the Fine Arts. On the occasion of the recent Royal visit, he had the honour of being presented to her Majesty. Mr. Sellars, who was held in high esteem alike in public and private life, leaves a widow and family.

Mr. Daniel Miller, C.E. — The death is announced of Mr. Daniel Miller, C.E., of Glasgow, formerly of the firm of Bell & Miller, St. Vincent-street. The son of a Glasgow brass and iron founder and copper-smith, who long carried on the Saracen Foundry (subsequently owned by the late Mr. Walter Macfarlane), the deceased was (according to the *Glasgow Herald*) born in January, 1826, so that at his death he was well advanced in his sixty-third year. He served a regular pupilage in civil engineering in the offices of Mr. Lewis D. B. Gordon and Mr. Laurence Hill, the former of whom was Rankine's predecessor in the Chair of Civil Engineering and Mechanics in the University of Glasgow, and was, indeed, the first holder of that appointment. It was while in that office that young Miller first made the acquaintance of the late Mr. R. Bruce Bell, with whom he afterwards,—in 1850,—entered into the partnership which was so closely identified with the profession of civil engineering.

THE AUCTIONEERS' BENEVOLENT FUND.

The annual meeting of the donors and subscribers to this fund was held on Wednesday last at the Estate Exchange, Auction Mart, Mr. Daniel Watney, Treasurer, in the chair. There was a good attendance.

The report of the committee contained the following passages:—"Your committee have again the pleasure to report an increase in the subscriptions for the past year, although the donations are less. They are as follows:—Subscriptions, 248*l.* 17s.; donations, 42*l.*; against 222*l.* 12s. and 93*l.* 9s. respectively received in 1887. During the past year there have been eleven new subscribers, while the society has lost by death and otherwise four old subscribers. The former includes the Auction Mart Company, who have generously given their first annual subscription of 10*l.* 10s., while the donations include the sum of 31*l.* 10s. kindly presented to the society by the executors of the late H. E. Murrell, Esq., out of a sum of money left for charitable purposes by the deceased. Much can be done by individual effort, and in order to make the society more worthy the profession, your committee hope that subscribers will never lose an opportunity of pressing the claims of the fund upon any non-subscribers with whom they have any influence. The applications for relief are on the increase, and there are several candidates for annuities." The report went on to enumerate the various cases relieved during the year, and gave particulars of seven annuities paid from the fund, amounting in the aggregate to 134*l.* per annum. The report then continued as follows:—"In addition to the above, your committee announce with very great pleasure that the sum of 35*l.* was at the close of last year handed to the Treasurer by a gentleman (who does not wish his name to be known), with a request that 5*l.* should be presented to each of the seven annuitants as a special gift in commemoration of the Jubilee of her Majesty's reign. The money was accordingly distributed at Christmas last, and it is hardly necessary to add that the recipients were most grateful to their unknown benefactor. During the year the sum of 235*l.* has been added to the investments, and in order to increase the income available for annuities the amount recently in Consols has been re-invested in India Three-and-a-Half per Cent. Stock, the investments now being—Queensland Four per Cent. Inscribed, 2,979*l.* 8s. 6d. Stock; India Three-and-a-Half per Cent., 1,034*l.* 17s. 3d. Stock. The members of the committee retiring by rotations are:—Messrs. Driver, Green, Haines, Harris, Tewson, Wilkinson, Woods, and the Chairman of the Exeter and Devon Auctioneers' Association, all of whom are eligible for re-election."

The report was adopted, and Mr. C. R. Foster, of Pall Mall, was added to the Committee. Several new subscribers (through the instrumentality of Mr. H. J. Thurgood) were announced. Some other business was transacted, and the proceedings terminated.

A NOVEL LIGHT AND AIR CASE.

An application for an injunction to restrain the defendant from erecting a building was made last week by Messrs. Nott, Watson, & Co. against Mr. Harrod. The structure for which the rights were claimed was a large timber-store formed with timber framing, carrying a pantile roof. The building is of large dimensions, the side next to the defendant's new building having a brick wall about 8 ft. high, and the remainder of wood, the boards 8 in. in width, with three inch-spaces, the light inside the building being bright and clear, admirably suited to the purpose of sorting and arranging boards of various kinds.

After the first hearing before the Vacation Judge (Sir James Hannen), the parties met and agreed to terms, so that the building will proceed.

Mr. H. Lovegrove was surveyor for the plaintiffs, and Mr. C. W. Stephens and Mr. A. Williams for the defendants.

Owing to this arrangement to compensate for damage, a decision in a novel case, which could not but have been of much interest, was not obtained.

ACTION FOR PROFESSIONAL FEES.

LEGG *v.* MASON.

On Wednesday, in the Westminster County Court, this case was tried by his Honour Judge Bayley and a jury. The plaintiff is an architect, and holds the post of Architect to Christ's Hospital, and he sought to recover from the defendant, a gentleman living at 9, St. James's-place, W., the sum of 39*l.* odd for professional fees.

The plaintiff's case was that early in 1885 he was called upon by the defendant's then solicitor, and asked to examine a house opposite to him, and give his opinion as to whether it shut out his (Mason's) light and air. He did so, and an action was brought by the defendant against the owner of the house, a gentleman named Moore. The plaintiff attended five days at the High Court, but was not examined till the fifth day. It was necessary for him to make plans and do other work, for which he had charged 18*l.* odd, and he had only charged five guineas a day for attendance, although he usually got ten guineas. He had not been paid anything for his services. Mr. Mason lost his action, and he had heard that he had paid 1,700*l.* in costs.

For the defendant it was contended that a charge he paid his solicitor in reference to costs was an answer to the claim, and that it was the duty of his solicitor to have paid the plaintiff his charges. This charge was put in, and showed that professional charges were left out of it.

His Honour said there was no defence whatever to the action, and the jury at once returned a verdict for the plaintiff for the amount claimed.

Cheadle and Gatley Main Drainage.—The scheme of Mr. J. B. Everard, M. Inst. C.E., of Leicester, has been placed first in the competition for the main drainage of Cheadle and Gatley, near Manchester; that of Messrs. Brierly & Holt, of Manchester and Blackburn, second; and that of Messrs. Landsborough & Preston, of Bradford, third. We understood that Mr. James Mansergh, M. Inst. C.E., of London, was called in by the Local Board to advise them in making the award. The amount of the estimate for the successful scheme was 23,300*l.*

New Police Buildings at Finchley.—A new police-station is at present in course of erection in Ballard's-lane, Finchley, and is fast approaching completion. The front elevation is in Mansfield stone and red moulded brickwork. The building contains three floors, one floor providing residences for the inspector and accommodation for the officers of the force. The ground floor contains the inspector's and other offices and waiting-rooms, and at the rear are cells, ambulances, sheds, and stables. Messrs. Kirk & Randall are the contractors.

COMPETITIONS COMMITTEE, ROYAL INSTITUTE OF BRITISH ARCHITECTS.

Sir,—Will you allow us to state, through your journal, that we are now preparing a revised list of those architects who have signed an agreement not to take part in any public architectural competition unless one or more professional assessors are appointed to advise the promoters, and that we shall be glad to receive the signatures of those architects who have recently started in practice, or have not yet signed the undertaking, and shall be pleased, on application, to send them the usual printed form.

The revised list will show a very considerable increase in the adherents, in spite of the inevitable loss by death or resignation, and there can be no doubt that a large measure of reform has already been the result of the efforts made to obtain, wherever possible, the appointment of a professional referee.—We are, your obedient servants,

Cole A. Adams,
Aston Webb,
Hon. Secs. of the Committee.

9, *Conduit-street, Hanover-square, London, W.*, October 10, 1888.

THE MILDMAY TOMB IN ST. MARY'S CHURCH, CHELMSFORD.

Sir,—No doubt your illustration of this monument is a correct reproduction of Mr. E. A. Bartlett's drawing.* I therefore think it only right to point out that it is far from accurate.

Had a scale been given, or a few dimensions, the value of the drawing would have been enhanced.

I give a few figures, by means of which those interested may find the correct proportions of the main parts of the monument.

The length of the plinth is 8 ft. 2 in.; height from floor to top of cornice is 4 ft. 6½ in., but in illustration scales, 5 ft. 1 in., making a difference in height of 6½ in., and altering the proportion of the lower parts considerably. The centre panel, with achievement, is much nearer square than shown, being 18 in. high by 16½ in. wide; and there is no such line as that shown across the lower part of the panel; the base of the shield touches the bottom of the panel in the original.

The semicircular pediments are drawn much too wide, and should be struck from a point 1½ in. above cornice.

The radius of the curves to the sides of the ogee pediment should be about 6 in. less than shown. The strap-work has several parts omitted, including two large scrolls beneath the inscription-panel, and the tablet with the date is about half its correct length.

There are minor points, such as the shape of the pinnacles on the cornice (which in the original vary much from the illustration) and incorrect jointing; but I think I have shown that the drawing is far from being a correct delineation of the monument.

I presume it will be generally admitted that, if illustrations of old work are to be of use, they must be accurate, and I therefore trust you will see my reason for bringing the above before your notice.

Francis E. L. Harris.

Chelmsford, Oct. 9, 1888.

SUGAR IN MORTAR.

Sir,—In some buildings to be erected this autumn I am anxious to protect brickwork from damage by frost. I should feel greatly obliged if you or some of your numerous readers would kindly give their experiences of mixing sugar with mortar, at same time give quantity required to a load of lime, and also name the quality found suitable. I am led to suppose with this addition to ordinary mortar that a struck joint would remain uninjured.

Reader.—

The School of Art Wood-Carving.—The School of Art Wood-Carving, held at the City and Guilds' Institute, Exhibition-road, South Kensington, has been re-opened after the usual summer vacation, and we are requested to state that one or two of the free studentships in the evening classes maintained by means of funds granted to the School by the Institute are vacant. To bring the benefits of the School within the reach of artisans a remission of half fees for the evening class is made to artisan students connected with the wood-carving trade. Forms of application for the free studentships, and any further particulars relating to the School, may be obtained from the manager.

Lyric Theatre.—We understand that the decoration of this theatre is to be entirely carried out by Messrs. Campbell, Smith, & Co.

* Of course: it is a photograph.—Ed.

The Student's Column.

ARTIFICIAL STONE.—XV.

Stones formed from Residuals, By-products, &c.

THE sixth division of our subject includes those artificial stones mainly formed from ingredients which are by-products or residuals in manufacturing, mining, or quarrying operations, and comprises a few patents of considerable interest, some of which have been referred to in preceding sections. One of the earliest patents that can be grouped in this class was Swindell's, who, in 1841, proposed to utilise a residuum consisting of oxide of iron, silica, alumina, lime, sulphate of lime, and chromate of iron, produced in the manufacture of chromium compounds. The same patentee also suggested plans for preparing cements and artificial stones from vat-waste of alkali makers and the residual oxide of iron obtained by burning iron pyrites in sulphuric acid manufacture.

A large number of patentees have attempted, with more or less success, to utilise the inexhaustible and ever-increasing accumulation of slag from iron and other smelting works. Some rather serious difficulties have to be overcome before a really workable and economical stone can be obtained from this substance; thus, if it be obtained (as already described) by casting the fused slag in moulds, it will be flinty, brittle, and difficult to work, and also vary considerably in homogeneity; on the other hand, if the slag be used in the form of sand or cement, to be added to other cements, the wear and tear of the grinding machinery and the weight of the stone produced will, as a rule, prevent its economical employment at any distance from the place of manufacture.

Blanchard's patent process for dealing with slag involves the mixing of ground slag with refuse from granite and slate quarries, clay, lime, chalk, silica, alkalies, or similar materials; the mass being moulded with water is fired in a kiln, and the resulting semi-vitrified stone is of the nature of terra cotta.

Bodmer employed a mixture of slag, cinders, scoriæ, &c., ground up with slaked lime. As regards the best form for admixture with lime, Tetmaier has quite recently shown that to increase the cohesive power of a cement or artificial stone composition containing slag, it is very important to granulate the slag before mixing it with the lime, &c. The explanation of this necessity is to be found in the theory that, in the process of granulation by sudden cooling of the melted slag with water, a molecular condition is produced favourable to a certain degree of combination between the slag particles and the lime; a little of the silica is also rendered soluble, and some sulphur got rid of, and this latter seems to be an advantage. The nature of the prejudicial influence exerted by sulphur, if present in any quantity, seems to be somewhat obscure, though it possibly may be due in some measure to the formation of soluble and easily decomposable alkaline or alkaline earthy sulphides. Tetmaier also asserts that cold destroys the cohesiveness of a slag mortar or stone mixture, which therefore should not be used or exposed when freshly made to a temperature below the freezing point. The proportion of lime to slag-sand, according to the same authority, should never exceed 48 per cent., and the best results are, as a rule, obtained with a proportion of from 30 to 40 per cent. In Pozzi's patent process "granitic" sand, obtained by disintegrating refuse granite by heat, is combined with slag, glass, and a large proportion of ordinary and refractory clay, mixed with water to a pasty consistency, moulded to the required form and allowed to harden.

M. Laurette prepared a stone which might be "cut, sawn, turned, or carved," by mixing powdered blast-furnace slag with hydraulic or other cement, pressing strongly in moulds while yet moist, and allowing to harden at the ordinary temperature. Mr. C. Woods, who at the Cleveland Slag Works laboured indefatigably to turn to profitable account the mountains of slag which in the Cleveland district are ever growing, and which threaten to attain ultimately Alpine proportions, combined slag sand with iron ore or refuse pyrites and quick-lime, hydraulic or other cement. The slag is run from the furnaces in a melted state on to revolving iron tables, cooled rapidly with water, and broken up to varying degrees of fineness. This slag sand may be made into bricks with Scott's selenitic lime (already described); in the proportion of 10 parts of the sand to 1 of selenitic lime. The bricks, after pressing and moulding, are dried in air. For building stone Mr. Woods prepared a composition containing 2½ parts finely-pulverised slag, 2½ parts of ground firebrick, 1 part of Portland cement, and sufficient water; this mixture placed in moulds sets quickly, and it is ready for use in two or three days. It may be of interest to our readers, as showing the cost of bricks made from this waste product in a large centre of production, to point out that at Middlesbrough the price quoted was, about a year ago, 13s. 6d. per 1,000.

Mr. Ransome suggested the use of a cement for stone-making which he alleged was at least thirty per cent. stronger than the best Portland cement, and which was prepared by mixing slag sand in a wet state with chalk and then burning to clinker in a cement-kiln and grinding as for Portland cement.

Another mixture said to be useful is formed of 2 parts of blast furnace slag, 5 parts of lime, and 2 parts of clay; these ingredients are well mixed, calcined, and ground.

RECENT PATENTS.

ABSTRACTS OF SPECIFICATIONS.

14,851, Stone-dressing Machinery. J. Coulter.

In machines of a class where the stone is placed upon a table traversing backward and forward underneath cutting-tools, after the manner of an iron planing-machine, it is claimed that improvements are made by this invention. They consist (1) in the employment of cutting-tools placed horizontally, and in cutting-tools placed vertically, for the purpose of dressing or cutting the upper surface and also one edge of the stone, and (2) an apparatus for reversing such tools. Tool-holders of special form are used, and a simultaneous movement is imparted to them by gearing adapted for the purpose. A rocking bar and lever is also constructed and adapted particularly for rocking the cross-head when reversing the position of the tools.

14,955, Syphon-flushing Cisterns. D. T. and W. Bostel.

The design of this invention is to obviate the noise in discharging the cistern. An extra bend is placed on the syphon-leg, and over its orifice is fitted a perforated pipe, or a cage, or wire-guard, in which is contained a ball of light substance; this dropping on the open end of syphon, prevents the noise.

15,071, Chimney-top and Ventilator. J. Wright.

This invention relates principally to the construction of an improved chimney-top designed to prevent down-draught in the flue or chimney. The same construction is also applicable to ventilators to extract the foul air or vapours from apartments. Coned deflectors are used, and sometimes spiral tubes, to increase the draught.

15,203, Waste-flushing Cisterns. J. West.

By this invention a small cistern is suspended so that it oscillates in a larger one. When charged with water it is released by pulling back a catch, and flushes the pipes, &c.

16,459, Sash-fasteners. D. Knowles.

This invention aims at the production of a springless, simple, durable, and cheap sash-fastener, and one which cannot be opened from the outside without breaking a pane of glass, though easy to release from the inside. To the top rail of the bottom sash is fixed a metal bush having a pivot on which rotates an arm or lever, one end of this lever passing under an ordinary rack attached to the bottom rail of the top sash, thus securing both sashes from vertical movement. Further modifications are also made for greater security.

11,148, Checking or Subduing Fire. T. R. Douse.

This patent relates to a further detail of improvement in previous devices for subduing fire in the holds of ships or in buildings by the generation of gases. In this, a small, fragile receptacle, containing an acid, is broken by any suitable means, and the contents, mingling with another compound, the gas is let free. The breakage is effected either by wires, cranks, levers, &c., actuated by hand, or automatically acted upon by heat.

NEW APPLICATIONS FOR PATENTS.

Sept. 28.—13,952, H. Steven, Fittings for Baths, Lavatories, &c.—13,955, J. Rushton and T. Atkinson, Fastenings, &c., for Window-sashes.—13,977, A. Del Guerra, Opening and Closing Window-sashes.

Sept. 29.—14,011, J. Jones, Attaching Cords to Sash Windows.—14,014, W. Perry, Window-fastening.—14,029, H. Berry, Dry-earth and other Closets.

Oct. 1.—14,073, R. Hyde, Raising and Lowering Sliding Windows, &c.—14,104, E. Dickinson and F. Kindermann, Ventilating Appliance.

Oct. 2.—14,127, H. Lake, Pipe-hooks.—14,158, D. Clohesy, Under-cutting or Dovetailing Wood, Stone, &c.—14,159, N. Hepworth, Shop-fronts.—14,166, L. Boutin, Chimneys and Ventilators.—14,167, A. Thomson, Paint or Enamel.—14,173, W. Dawson, Window-sashes.—14,175, L. Pichery, Tools for Working Stone, Slate, Marble, &c.

Oct. 3.—14,198, S. Smith, Combined Ventilator and Gas Bracket for Walls.—14,202, E. Mann, Opening and Shutting Windows or Shutters.

Oct. 4.—14,269, J. Wilson, Walls, Buildings, &c.—14,286, J. Ransome, Artificial Stone and Concrete Blocks.—14,288, M. Moser, Burglar Alarum.

PROVISIONAL SPECIFICATIONS ACCEPTED.

11,250, T. Dowd, Casement Fasteners and Lift-latches.—11,466, C. Southon, Chimney-cowl.—12,068, F. Harvey, Immediately Stopping Bursts or Leaks in Water or Gas Pipes.—12,173, C. Young, Automatic Bolt for Double Doors.—12,192, T. Hargreaves, Safety Window-fastening.—12,225, K. Bernhard, Safety Contrivance for Windows.—12,258, T. Whittaker, Hinges for Folding-doors, &c.—12,330, W. De Morgan, Walls and other Brick Structures.—12,499, R. Mason, Windows and Operating same.—12,569, T. Harris, Stoves or Fireplaces.—12,570, T. Harris, Fire-bars or Grates.—12,571, T. Harris, Stoves.—12,592, C. Hamilton, Attaching Incandescent Electric-lights to Gas-brackets, &c.—12,675, F. Butler, Builders' or Decorators' Scaffolding, &c.—12,676, De Pennefather, Ventilating Buildings, &c.—12,701, O. Imray, Preventing Window-sashes Shaking.—12,708, E. Nunan, Metal-laths for Building.—12,729, G. Böklen, Metallic Roofing.—12,739, J. Hancock, Creating Updraughts in Chimneys and Ventilating.—13,096, J. Rogers, Flushing Cisterns or Water-waste Preventors.—13,177, R. Thomson, Combined Lavatory and Water-closet Basins.—13,536, W. Howcroft, Paint Brushes.

COMPLETE SPECIFICATIONS ACCEPTED.

Open to Opposition for Two Months.

15,520, W. Stanford, Jointing Stoneware and Other Pipes.—15,996, W. Lake, Preventing the Slamming of Doors.—16,069, E. Grube, Ventilating Fans.—16,262, F. Seyde, Metallic Lathing or Backing for Plaster or Cement Partitions and Ceilings.—16,507, F. Collins, Indicator for Door-fastenings.—3,197, W. Morier, Whitewash and Distemper Brushes.—10,706, G. Evans, Window-frames and Hanging the Sashes.—11,202, C. Schubert, Band-saw Machinery.—12,329, A. Boult, Door-knob Attachments.—12,397, W. Thompson, Sewer-gas Excluders.

RECENT SALES OF PROPERTY.

ESTATE EXCHANGE REPORT.

OCT. 2.

By S. WALKER & RUNTZ.

Kensington—23, Addison-gardens South, 70 years, ground-rent £13	£600

OCT. 3.

By FULLER, HORSEY, SON, & CASSELL.

Enfield Highway—A freehold fruit farm, 19a. 1r. 30p.	3,000

By T. TURNER.

Hyde Park—91, Edgware-road, 28 years, ground-rent £18. 8s.	1,000
Paddington—26 & 28, Westbourne-park-villas, 455 years, ground-rent £15. 6s.	1,605

By F. HARDS.

Greenwich—7, Tyler-street North, freehold	210
The beneficial interest in 13-169th parts of the "Crown and Sceptre" Hotel; a plot of land; and No. 10, Queen-street, freehold	170

OCT. 4.

By FURBER, PRICE, & FURBER.

Islington—81, 83, & 85, Essex-road, and a plot of land, freehold; also 79, Essex-road, 94 years, ground-rent £185	3,750

By NEWBON & HARDING.

Highbury—41, Kelvin-road, 71 years, ground-rent £8	300
Barnsbury—7, John-street, 21 years, ground-rent £3. 3s.	130
Islington—49, Queensbury-street, 22 years, ground-rent £1 15s.	140
Holloway—26, Tabley-road, 78 years, ground-rent £7	345
23 and 25, Hanley-road, freehold	985
27, Hanley-road, 18 years, ground-rent £5	150
A plot of freehold land in rear	500
Ground-rents of £12, reversion in 89 years	290
West Green-road—A plot of freehold land	60
Derby-road—Two plots of freehold land	125
Southgate, Chase Side—Two plots of freehold land	170
Worthing—5, 6, 10, 11, and 12, Palmerston-terrace, freehold	1,110

OCT. 5.

By TOPLIS & HARDING.

South Kensington—7, Sumner-place, 40 years, ground-rent £15	2,000

MEETINGS.

TUESDAY, OCTOBER 16.

Glasgow Architectural Association. — Professor G. Baldwin Brown on "The Art of Decoration."

WEDNESDAY, OCTOBER 17.

Builders' Foremen and Clerks of Works' Institution.—Quarterly Meeting. 8.30 p.m.

FRIDAY, OCTOBER 19.

Architectural Association.—Address by the President, Mr. H. D. Appleton. 7.30 p.m.

Miscellanea.

Sale of Building Sites and Ground Rents at Brentwood.—Last week Messrs. Baker & Sons offered for sale a large number of building sites on the Ongar-road Estate at Brentwood, Essex. The sale also included several dwelling-houses on the estate, and a number of freehold ground rents. The sale took place at the White Hart Hotel, when there was a numerous attendance of buyers. The building sites submitted were eighty-nine in number, nearly the whole of which have frontages of 20 ft. each, and depths of from 150 ft. to 200 ft., some larger plots having frontages of 24 ft. and 30 ft. each. A large hotel plot, having a frontage of 50 ft. and a depth of 195 ft., was likewise included in the sale. Out of the entire number of sites offered, ten were shop plots, having their frontages to the main Ongar-road, and for these there was a close and spirited competition, all of them finding purchasers at prices ranging from 30*l.* to 35*l.* each. For the remaining plots, having their frontages to a newly-formed road, named Retallack-avenue, the prices obtained varied from 12*l.* to 20*l.* each, the whole of them being sold. The hotel plot realised 60*l.*, the total sum received for the several sites being about 1,200*l.* The auctioneer next submitted for sale thirteen dwelling-houses which have recently been erected on the estate. They are all uniform in size, and were described as well and substantially built, containing seven rooms each, and approached by a 22 ft. tiled fore-court, fitted with cathedral glass, tiled stoves, Sicilian marble mantels, and large kitchen-ranges. They are held for an unexpired term of ninety-six years, at a ground-rent of 5*l.* per annum, and let at rentals of 18*l.* a year each. They were offered in separate lots, the auctioneer stating that they were offered absolutely without reserve, by order of the mortgagee, and would all be sold whatever they might fetch. The highest sum offered for any of the dwellings was 50*l.*, the majority of them being sold at the unusually low price of 47*l.* each (!) the tenants being understood to be the purchasers. The ground-rents on the above thirteen houses, amounting to 65*l.* a year, were next submitted, and for these there were several competitors, the sum realised being 1,600*l.*, representing about four per cent. on the purchase, the total aggregate proceeds of the day's sale being about 3,400*l.*

A New Music-hall at Brighton.—The new music-hall known as the "Brighton Alhambra" has been completed. We are informed that it has received special attention on the part of Mr. Frank Matcham, the architect, who has provided a system of appliances for the prompt extinction of a chance outbreak of fire. By arrangement with the Brighton Waterworks, a special large main has been laid off the extra high-pressure water-main which supplies the Grand Hotel, 100 yards from the Alhambra entrance, and this main shows a constant pressure of nearly 250 ft. head. Thence a 4-in. fire-main has been fixed by Messrs. Heathman & Co., of Endell-street, into the promenade, rising to the gallery, with Heathman's improved hydrants mounted upon the pit, dress-circle, and gallery levels. Another main is fixed under the auditorium to the cellar, with similar hydrants upon the stage, fly, and dressing-room levels behind the scenes, and each is supplied with a set of hose, nozzle, and interchangeable couplings. To provide against a chance failure of the Water Company's supply, a capacious storage tank, 11 ft. 6 in. by 6 ft. by 5 ft. 6 in., has been fixed over the gallery, and the fire-main connected thereto with Heathman's "automatic reflux valves," enabling the water to flow to the hydrants from either the waterworks main or the tank, according to which yields the highest pressure when a fire happens. A pressure tell-tale is fixed to indicate the variations in the water pressure.

Sam Deards & Company (Limited).—We have received the prospectus of this new company, which has a share capital of 25,000*l.* The company has been formed for the purpose of purchasing, continuing, and developing the old-established business of horticultural and hot water engineer, carried on by Mr. Samuel Deards, and of the patents of "Victoria Dry Glazing" (No. 2,806), "Champion Coil Boiler" (No. 761), and "Princess Louise Coil Grate" (No. 714). The registered offices of the Company are at 16, New Broad-street, E.C.

The Memorial to Lord Shaftesbury.—The marble statue intended to perpetuate the memory of this distinguished philanthropist has been placed in a commanding position near the western door of Westminster Abbey. The statue is the work of Mr. J. E. Boehm, R.A., and was executed from a bust by the same artist, which was finished from life a few years before his lordship's death. He is represented in the robes of the Garter in a contemplative attitude, with his hands clasped in front. The statue is about 8 ft. 6 in. in height, and is placed upon a marble pedestal, similar to most of those erected during recent years in the Abbey, and from designs by the late Sir Gilbert Scott, R.A. It is said by his family and by others who were intimately acquainted with him to be a very striking and happy likeness. The pedestal bears the following inscription, suggested by the Dean of Westminster:—

Antony Ashley Cooper,
SEVENTH EARL OF SHAFTESBURY, K.G.
BORN, APRIL 28, 1801,
DIED, OCTOBER 1, 1885.
ENDEARED TO HIS COUNTRYMEN
BY A LONG LIFE SPENT IN THE CAUSE
OF THE HELPLESS AND SUFFERING.

"LOVE. SERVE."

(the two latter words being the well-known family motto of the Shaftesburys). The second portion of the memorial has been entrusted to Mr. Alfred Gilbert, A.R.A., and will take the form of a bronze fountain, both drinking and playing; it will illustrate in a series of panels Lord Shaftesbury's life work. As soon as the model is sufficiently advanced, it will be placed *in situ* for the inspection of the public. The committee are not without hope that the artistic merit as well as the utility of this work will secure for it a site in Piccadilly-circus, at the entrance of Shaftesbury-avenue. A sea-side or country home for poor and convalescent children would form a fitting supplement to the above memorials, and would, it is thought, be such a memorial as the great philanthropist himself would have selected could he have had the choice. The committee desire to obtain if possible suitable premises, healthily situated and sufficiently large to accommodate under good sanitary conditions some fifty or sixty children, to whom a few weeks' residence in such a home would be a great and permanent boon. It is calculated that if the Government give the metal required for the fountain, about £1,000 will remain in the hands of the treasurer, after paying for the memorials already described, towards the purchase of a house for this purpose. If this amount could be augmented by generous friends it would add to both the usefulness and interest of such an institution, and bring increased blessing and happiness to many a poor and neglected child. Mr. H. R. Williams, of 6, Lime-street, E.C., the hon. sec. to the Shaftesbury Memorial Committee, will be glad to hear from friends desirous to help on this project.

The English Iron Trade.—With the exception of pig-iron, in which there has been a slight giving way in prices, the English iron market generally is just as firm and steady as it has been for some time past. Owing to the irregularity and flatness of the Glasgow warrant market, some brands of Scotch makers' iron have dropped another 6d. a ton. Middlesbrough iron has also suffered to a like extent, but Bessemer iron remains steady in the North-West at last week's quotation. Lancashire pig-iron remains strong, whilst in Staffordshire and East Worcestershire the pig-iron market continues firm. Owing to the great activity in the finished iron trade, manufactured iron still shows an upward tendency. Marked bars have been advanced 10s. a ton, whilst crown bars are fully from 2s. 6d. to 5s. a ton dearer. Black sheets are also 5s. higher. Tin plates continue firm in price, notwithstanding that the trade is not very brisk just now. Steel is taking another upward turn, in sympathy with finished iron, and the quotations of nearly all steel materials have risen in the North-West. Shipbuilders continue to receive new inquiries, and about double the tonnage is under construction compared with this time last year. Engineers have a good current of fresh orders.—*Iron.*

Building land at Crouch End.—It will be noticed from our advertising columns that Messrs. E. E. Croucher & Co., of Chancery-lane, are about to offer by auction some freehold building land at Crouch End.

Properties for Sale.—An estate of 3,400 acres near to Kington, a large market for Welsh farm-produce, on the western confines of Herefordshire, in the old honour and manor of Huntington. The several lots lie in Lyonshall, Titley, Kington, and Stanton-on-Arrow parishes, in the vicinity of two railway stations, and the branch line from Leominster to Kington. A warren of 250 acres and seven farms are on the land; the various holdings yielding an annual rental of 3,150*l.* Here is good shooting, whilst the Arrow is justly famed for its trout. Lyonshall Castle, built by William II. in the year 1090, was demolished in the reign of Edward II. The ruins lie by the graveyard of St. Michael and All Angels' Church, which was re-opened, after restoration, in August, 1873. A few miles further westwards is another lot—the Bwlch Farm, near to Colva, with some building and accommodation land in Presteign township. Also the sporting estate of East Somerton, lying between Winterton (on the sea-coast) and Martham, about nine miles north of Yarmouth, and near to the Norfolk Broads. Together with Burnley Hall and its grounds of 382 acres will be sold certain plantations and farms covering about 1,130 acres in all. Hales, the Norfolk giant, a native of this parish, lies in the churchyard of St. Mary, West Somerton. The church has been lately renovated, when some interesting wall-paintings were found. Here, *temp.* Henry II., Sir Ralph de Granville, Lord Chief Justice, founded a hospital for lepers.

The Sanitary Institute.—The first meeting of the Council of this society, which has recently been incorporated, was held at the Parkes Museum on the 5th inst. The Institute is founded to carry on the objects of the amalgamated Sanitary Institute of Great Britain and the Parkes Museum. Sir Douglas Galton, K.C.B., F.R.S., was unanimously appointed Chairman, and Mr. G. J. Symons, F.R.S., the Registrar. H.R.H. the Duchess of Albany and H.R.H. the Duke of Cambridge have consented to become members of the Institute. The Marquis of Ripon, Earl Derby, Earl Bathurst, Viscount Cranbrook, the Bishop of London, Lord Ebury, Lord Mount-Temple, and 370 other members and Associates were enrolled. An important letter was read from the Charity Commissioners, saying that they considered that the new Institute was likely to prove a powerful means for the diffusion of sanitary knowledge, and promising to grant facilities to the Institute to deliver lectures in the various buildings which the Commissioners proposed to establish in different parts of London. It was decided to hold the Institute's first examination on November 8 and 9. A programme of lectures for the winter session is in course of preparation.

Improvements in Berlin.—The Municipality of Berlin are contemplating some extensive improvements and the erection of several new public buildings in their city. Among the latter are a large central National Museum, a new Academy of Art and Science, and a new Opera House; and among the former, the razing of the present rookeries along the Spree, thereby giving the Royal Palace a free view of the Unter den Linden, and the laying out of fine, broad streets in this locality. The new Cathedral, so long contemplated, will also shortly be begun. Last year 600 new houses were built in Berlin, most of them three or four storeys in height, whilst 550 old ones were pulled down. No less than 7,277 building licences were granted, of which 1,025 referred to new suburbs. The motto of the city of Berlin, by the way, is *Berlinum lumen orbi.*

"Archimedes Discounted it."—Such is the heading which the *New York Herald* of the 25th ult. puts to the following telegram:—"Chicago, Ill., Sept. 24, 1888.—The mammoth McCormick Building, at the corner of Jackson and Market streets, on the river, six stories in height, and covering half a block, has been raised 6 ft., to correspond with the grade of the new viaduct just built on Jackson-street. The huge brick structure, weighing many thousand tons, was raised by means of jack-screws, and not a piece of mortar was displaced in the operation."

Wood Green Local Board.—The newly-created Local Board for Wood Green met for the first time on the 3rd inst., when Mr. Littler, Q.C., was elected chairman. Mr. J. F. Adams was appointed Clerk *pro tem*, and it was agreed to ask Mr. Henry Robinson, C.E., of Westminster, to undertake the engineering supervision of the district at the outset.

PRICES CURRENT OF MATERIALS.

TIMBER.	£.	s.	d.	£.	s.	d.
Teak, E.I. ..... load	8	0	0	12	10	0
Sequoia, U.S. ..... foot cube	0	2	3	0	3	0
Birch, Canada ..... load	2	15	0	4	15	0
Fir, Dantsic, &c.	2	0	0	4	0	0
Oak ,, ...	2	0	0	4	10	0
Canada	4	0	0	6	10	0
Pine, Canada red	2	10	0	3	10	0
,, yellow	2	10	0	4	0	0
Lath, Dantsic ..... fathom	3	10	0	5	0	0
St. Petersburg	5	0	0	6	0	0
Wainscot, Odessa, crown	2	10	0	3	0	0
Deals, Finland, 2nd and 1st ...std. 100	9	0	0	10	0	0
,, 4th and 3rd	7	0	0	9	0	0
Riga	7	0	0	8	0	0
St. Petersburg, 1st yellow	9	10	0	15	10	0
,, 2nd ,, ...	9	0	0	10	0	0
,, white	7	10	0	10	10	0
Swedish	7	10	0	16	10	0
White Sea	8	10	0	17	10	0
Canada, Pine, 1st	16	0	0	25	10	0
,, ,, 2nd	10	10	0	17	10	0
,, ,, 3rd, &c.	7	10	0	10	10	0
,, Spruce, 1st	9	0	0	10	0	0
,, 3rd and 2nd	7	0	0	8	10	0
New Brunswick, &c.	6	10	0	8	0	0
Battens, all kinds	5	10	0	12	0	0
Flooring Boards, sq., 1 in., prepared, First	0	11	0	0	14	6
Second	0	8	0	0	10	9
Other qualities	0	5	6	0	7	9
Cedar, Cuba ..... foot	0	0	3½	0	0	3½
Honduras, &c.	0	0	3½	0	0	3½
Australian	0	0	2	0	0	3
Mahogany, Cuba	0	0	4½	0	0	5½
St. Domingo, cargo average	0	0	4½	0	0	5½
Mexican ,, ...	0	0	4	0	0	4½
Tobasco ,, ...	0	0	4½	0	0	5½
Honduras ,, ...	0	0	4½	0	0	5½

TIMBER (*continued*).	£.	s.	d.	£.	s.	d.
Box, Turkey ..... ton	5	0	0	12	0	0
Walnut, Italian ..... foot	0	0	4½	0	0	6
METALS.						
IRON—Bar, Welsh, in London ...ton	4	17	6	5	0	0
,, ,, at works in Wales ...	4	7	6	4	10	0
,, Staffordshire, in London ...	5	5	0	6	15	0
COPPER—						
British, cake and ingot..... ton	80	0	0	81	0	0
Best selected	81	10	0	82	0	0
Sheets, strong	88	0	0	0	0	0
Chili, bars	78	10	0	0	0	0
LEAD—						
Pig, Spanish ..... ton	14	10	0	0	0	0
English, common brands	14	15	0	0	0	0
Sheet, English	15	15	0	0	0	0
SPELTER—						
Silesian, special ..... ton	19	5	0	19	7	6
Ordinary brands	19	0	0	19	2	6
TIN—						
Straits ..... ton	101	10	0	0	0	0
Australian	101	10	0	0	0	0
English Ingots	105	0	0	0	0	0
ZINC—English sheet ..... ton	22	10	0	23	10	0
OILS.						
Linseed ..... ton	19	10	0	19	15	0
Cocoanut, Cochin	26	0	0	27	10	0
Ceylon	25	5	0	25	10	0
Palm, Lagos	22	5	0	23	0	0
Rapeseed, English pale	28	10	0	0	0	0
,, brown	27	0	0	27	5	0
Cottonseed, refined	21	15	0	22	0	0
Tallow and Oleine	19	0	0	45	0	0
Lubricating, U.S.	4	0	0	6	0	0
,, refined	7	0	0	12	0	0
TURPENTINE—						
American, in casks ..... cwt.	1	12	3	0	0	0
TAR—						
Stockholm ..... barrel	1	1	0	0	0	0
Archangel	0	11	0	0	11	6

COMPETITIONS AND CONTRACTS.

Epitome of Advertisements in this Number.

COMPETITIONS.

Nature of Work.	By whom required.	Premium.	Designs to be delivered.	Page.
Laying out Property as Pleasure Grounds ...	Penzance Town Council	20 gs. and 10 gs. ...	Oct. 20th	ii.
Wallace and Bruce Memorial	Edinbrgh Magistrates, &c	Not stated.....	Not stated ...	ii.

CONTRACTS.

Nature of Work, or Materials.	By whom required.	Architect, Surveyor, or Engineer.	Tenders to be delivered.	Page.
Blue Guernsey or Clee Hill Granite	Wood Green Local Bd.	*Official*.....	Oct. 17th	ii.
Bridge and Approaches, Goods Station, &c....	L. & N. W. Ry. Co.....	do.	do.	ii.
Underground Urinals and Water-Closets, &c.	Commis. of Sewers	do.	Oct. 19th	ii.
Sewerage Works, Isle of Man	Ramsey Town Commrs.	J. Mansergh	Oct 22nd	ii.
Repairs of Private Road	Croydon Corporation ...	*Official*.....	Oct. 23rd	x.
Road Making and Paving Works	Hammersmith Vestry...	H. Mair	Oct. 24th	x.
Works, Repairs, &c.....	War Department	*Official*.....	do.	ii.
Receptacles for Dust, Refuse, &c.	Lambeth Vestry	do.	Oct 25th	ii.
Block of Buildings.....	Vestry of St. Giles, Camberwell.....	P. R. Whellock	Oct. 31st	ii.
Works and Repairs to Buildings	Com of H.M. Works	*Official*.....	Nov. 2nd	x.
Terrace Walk, Shelter Hall, &c.	Brighton Town Council	P. C. Lockwood	Nov. 15th	ii.
Alterations and Improvements to Schools	School Brd. for London	*Official*.....	Not stated	x.
Annual Repairs to Buildings and Furniture	do.	do.	do.	x.
Superstructure of New Banking Premises.....	National Prov. Bank of England	A. Waterhouse.....	do.	ii.

TENDERS.

[Communications for insertion under this heading must reach us *not later than* 12 *Noon on Thursdays.*]

BIRMINGHAM.—For the erection of a house at Barnt Green, near Birmingham, for Mr. C. F. Milward. Messrs. Jethro A. Cossins & Peacock, architects, 83, Colmore-row, Birmingham. Quantities by Mr. George Kenwrick:—

W. Sapcote & Sons, Birmingham ...	£1,798 0 0
W. & J. Webb, Birmingham	1,760 0 0
James Moffat, Birmingham.....	1,743 0 0
Gowing & Ingram, Birmingham	1,595 0 0
J. Barnsley & Sons, Birmingham ...	1,480 0 0
J. Smith & Sons, Birmingham	1,415 0 0
G. H. Huins & Sons, Redditch*	1,400 0 0

* Accepted.

CARDIFF.—For repairs to Atlas Works, Canton. Mr. Wm. Eve, architect, 10, Union-court, Old Broad-street, E.C.:—

O. Purnell.....	£220 0 0
C. Bird	200 0 0
W. Symonds.....	195 10 0
C. C. Dunn (accepted)	189 0 0

[All of Cardiff.]

DALSTON.—For making alterations to the Refreshment and Dining Rooms at Dalston Junction Railway Station, for Messrs. A. Probyn & Co. Mr. J. W. Brooker, architect.

Croaker	£432 0 0
Battley	397 0 0
Garratt & Son	383 0 0
Spencer & Co. (accepted)	366 0 0

ELING (near Southampton).—For converting a large store into a steam roller flour mill, for Messrs. Neave & Co. Mr. Fred Bath, architect, Salisbury. No quantities:—

H. J. Sanders, Southampton	£1,482 0 0
H. J. Kite, Salisbury	1,303 19 0
Webb & Co., Salisbury	1,282 5 1
Chas Mitchell, Woodfalls, Salisbury (accepted)	1,176 10 7

HAMMERSMITH.—For additions and repairs to three houses, St. Peter's-square, Hammersmith. Mr. Frederick Lea, architect, Buckingham-street, Strand:—

J. B. Gerrans.....	£1,430 0 0
Adams & Son (accepted).....	1,150 0 0
Engineer's Work.	
H. C. Price & Co. (accepted)	£193 10 0

LEWISHAM.—For new machine (bakery) and stabling at Riverdale Mills, Lewisham, for Mr. John Wallis. Mr. Horace T. Bonner, architect, 29 and 30, King-street, Cheapside, and Lewisham.

Kirk & Randall, Woolwich	£1,535 0 0
Jerrard, Lewisham.....	1,494 0 0

LONDON.—For the erection of three houses and warehouse in Leswin-road, Stoke Newington, for Mr. A. Hart. Mr. Wm. Eve, architect, 10, Union-court, Old Broad-street, E.C.:—

J. Holloway	£3,887 0 0
Atherton & Latta	3,375 0 0
Higgs	2,990 0 0
Holliday & Greenwood	2,977 0 0
Stimpson & Co.....	2,930 0 0
Johnson	2,912 0 0
Holland	2,898 0 0
Gould & Brand.....	2,885 0 0
Anley	2,860 0 0
Harris & Wardrop	2,838 0 0
Godfrey & Son	2,780 0 0
Jackson & Todd, 192, Hackney-road, E. (accepted)	2,735 0 0
Dabbs*	2,697 0 0

* Withdrawn in consequence of the increased price of materials between date of tender and its acceptance—viz., seven weeks.

LONDON.—For re-building the "Duke of York" public house, Queen-street, Edgware-road, W. Mr. J. W. Brooker, architect, 13, Railway-approach, London Bridge, S.E.:—

First List.	
Garratt & Son	£2,520 0 0
Battley	2,495 0 0
W. Downs	2,468 0 0
W. & F. Croaker	2,419 0 0
J. Beale	2,100 0 0
Second list, after reductions made in the work.	
Garratt & Son	£2,375 0 0
Battley	2,348 0 0
Burman & Son	2,290 0 0
W. & F. Croaker	2,269 0 0
Spencer & Co.	2,240 0 0
J. Beale	2,080 0 0
G. J. Kick (accepted).....	1,995 0 0

LONDON.—For proposed additions to store buildings in Finsbury-park, for the Metropolitan Board of Works. Mr. Thomas Blashill, architect. Quantities not supplied.

Russell	£485	0	0
Tevard	470	0	0
Dabbs	444	0	0
Harris	415	0	0
Lapthorn	397	0	0
F. Blandford	387	0	0
Timbs	305	0	0

LONDON.—For gas services and fittings to "The Mercer Arms" and houses adjoining in Castle-street and Mercer-street, Long-acre, for Messrs. Coombe & Co., Limited. Mr. B. Elson, architect, 115, Long-acre, W.C.:—

Buckley & Beech	£129	10	0
Comyn Ching & Co. (accepted)	111	8	6

LONDON.—For making up metalling, &c., of Highlever-road and Stoneleigh-street, for the Vestry of Kensington. Mr. W. Weaver, surveyor:—

Tomes & Wimpey	£284	0	0
Nowell & Robson	257	0	0
Mears	230	0	0
Rogers & Co. (accepted)	202	0	0

LONDON.—For pulling down and rebuilding the "Railway Bell," George-lane, Woodford, for Mr. W. Davies. Mr. Wm. Ansell, architect:—

W. M. Dabbs	£3,659	0	0
Godfrey & Son	3,590	0	0
Anley	3,285	0	0
Goodall (accepted)	3,242	0	0

LONDON.—For alterations and additions to the "Albion Tavern," Thornhill-road, Barnsbury, for Mr. A. Watson. Mr. Arthur F. Wrightson, architect. Quantities by W. Heelis, 26, Budge-row, Cannon-street, E.C.:—

Drew & Cadman	£1,723	0	0
Tatum	1,658	0	0
Pickford	1,594	0	0
Kellaway	1,580	0	0
Green & Lee	1,510	0	0
Allen & Son (accepted)	1,336	0	0

LONDON. — For alterations and additions to the "Golden Fleece," Essex-road, Islington, for Mr. H. Carter. Mr. Arthur F. Wrightson, architect, 26, Budge-row, Cannon-street, E.C.:—

Pickford (accepted)	£590	0	0

LUTON.—For small detached house, High Town-road, for Mr. Thomas Barker. Mr. W. A. Fisher, architect, Hemel Hempstead:—

W. & A. Cox	£374	10	0
D. Parkins	337	10	0
Wardle	295	0	0
J. Long	260	0	0
A. Long (accepted)	239	0	0

[All of Luton.]

SALISBURY.—For alterations, additions, and re-seating the Wesleyan Chapel, Salisbury, for the trustees. Mr. Fred Bath, architect, Salisbury. No quantities:—

Jerrard & Stevens, Salisbury	£1,710	10	0
Webb & Co., Salisbury	1,627	2	9
W. G. & C. S. Young, Salisbury*	1,568	7	6

* Accepted.

SOLIHULL (Warwickshire).—For the erection of a house and stable-buildings at Solihull, for Mr. George Matthews. Messrs. Jethro A. Cossins & Peacock, architects, 83, Colmore-row, Birmingham. Quantities by Mr. George Kenwrick:—

	House.	Stable Buildings.
J. Moffat,* Birmingham	£1,547 0 0	£207 0 0

* Accepted.

SOUTHWARK.—For the erection of stabling, &c., for Mr. Burkitt, in Friar-street, Southwark. Mr. J. W. Brooker, architect:—

Horswill	£185	0	0
Garratt & Son (accepted)	159	0	0

WALTHAMSTOW.—For the erection of a pair of shops in Markhouse-road. Mr. T. C. Barralet, architect, Bridge-chambers, Richmond:—

Bennett	£640	0	0
Good	624	0	0
Lucas	550	0	0
Judd	545	0	0
Chillingworth	525	0	0
Wardlow	519	0	0

WALWORTH.—For the erection of a workroom for Mr. Mold. Mr. J. W. Brooker, architect:—

Downs	£187	0	0
Gilbert (accepted)	172	0	0

WATFORD.—For Conservative and Constitutional Clubs. Mr. W. H. Syme, A.R.I.B.A. architect.

— Jones	£3,135	0	0
George Sear	2,300	0	0
W. B. Neal	2,154	0	0
T. Waterman	2,057	0	0
N. & E. Sear	2,050	0	0
T. Turner (accepted)	1,957	0	0

(All of Watford)

SUBSCRIBERS in LONDON and the SUBURBS, by prepaying at the Publishing Office, 19s. per annum (or 4s. 9d. per quarter), can ensure receiving "The Builder" by *Friday Morning's post.*

TERMS OF SUBSCRIPTION.

"THE BUILDER" is supplied DIRECT from the Office to residents in any part of the United Kingdom at the rate of 19s. per annum PREPAID. To all parts of Europe, America, Australia, and New Zealand, 26s. per annum. To India, China, Ceylon, &c. 30s. per annum. Remittances payable to DOUGLAS FOURDRINIER, Publisher, No. 46, Catherine-street, W.C.

PUBLISHER'S NOTICES.

Registered Telegraphic Address, "THE BUILDER, LONDON."

CHARGES FOR ADVERTISEMENTS.

SITUATIONS VACANT, PARTNERSHIPS, APPRENTICESHIPS, TRADE, AND GENERAL ADVERTISEMENTS.

Six lines (about fifty words) or under ..... 4s. 6d.
Each additional line (about ten words ..... 0s. 6d.

Terms for Series of Trade Advertisements, also for special Advertisements on front page, Competitions, Contracts, Sales by Auction, &c. may be obtained on application to the Publisher.

SITUATIONS WANTED.

FOUR Lines (about THIRTY words) or under ..... 2s. 6d.
Each additional line (about ten words)..... 0s. 6d.

PREPAYMENT IS ABSOLUTELY NECESSARY.

*** Stamps *must not* be sent, but all small sums should be remitted by Cash in Registered Letter or by Money Order, payable at the Post-office, Covent-garden, W.C. to

DOUGLAS FOURDRINIER, Publisher,
Addressed to No. 46, Catherine-street, W.C.

Advertisements for the current week's issue must reach the Office before THREE o'clock p.m. on THURSDAY, and for the Front Page by the same Hour on WEDNESDAY.

SPECIAL.—ALTERATIONS IN STANDING ADVERTISEMENTS or ORDERS TO DISCONTINUE same must reach the Office before TEN o'clock on WEDNESDAY mornings.

The Publisher cannot be responsible for DRAWINGS, TESTIMONIALS, &c. left at the Office in reply to Advertisements, and strongly recommends that of the latter COPIES ONLY should be sent.

PERSONS Advertising in "The Builder," may have *Replies addressed to the Office, 46,* Catherine-street, Covent Garden, W.C. *free of charge.* Letters will be forwarded if addressed envelopes are sent, together with sufficient stamps to cover the postage

AN EDITION Printed on THIN PAPER, for FOREIGN CIRCULATION, is issued every week.

Now ready.

READING CASES, { NINEPENCE EACH. By post (carefully packed), 1s.

W. H. Lascelles & Co.

121, BUNHILL ROW, LONDON, E.C.

Telephone No. 270.

HIGH-CLASS JOINERY.

LASCELLES' CONCRETE.

Architects' Designs are carried out with the greatest care.

CONSERVATORIES,
GREENHOUSES,
WOODEN BUILDINGS.

Bank, Office, & Shop Fittings.

CHURCH BENCHES & PULPITS.

ESTIMATES GIVEN ON APPLICATION.

TO CORRESPONDENTS.

C. S. & Co.—P. & R.—B. B.—B. S. (thanks; not required).—G. R. W.—C. H. B. (thanks).—W. H. & Co. (too late).—H. C. C. (too late).

All statements of facts, lists of tenders, &c., must be accompanied by the name and address of the sender, not necessarily for publication

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news-items) which have been duplicated for other journals, are NOT DESIRED.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; all communications relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

BEST BATH STONE.

CORSHAM DOWN. | FARLEIGH DOWN.
BOX GROUND. | COMBE DOWN.
WESTWOOD GROUND. | STOKE GROUND.

THE BATH STONE FIRMS, Limited.
HEAD OFFICES: BATH.

DOULTING FREESTONE.

THE CHELYNCH STONE. The stone from these quarries is known as the "Weather Beds," and is of a very crystalline nature, and undoubtedly one of the most durable stones in England.

THE BRAMBLEDITCH STONE. Is of the same crystalline nature as the Chelynch Stone, but finer in texture, and more suitable for fine moulded work.

Prices, and every information given, on application to CHARLES TRASK & SONS, Doulting, Shepton Mallet.

London Agent—Mr. E. A. WILLIAMS,
16, Craven-street, Strand, W.C. [ADVT.

HAM HILL STONE.

Greater facilities have been provided for working these quarries, and the stone can be supplied in large quantities at short notice.

Prices, and every information given, on application to the HAM HILL STONE CO., Norton, Stoke-under-Ham, Somerset.

London Agent—Mr. E. A. WILLIAMS,
16, Craven-street, Strand, W.C. [ADVT.

Asphalte.—The Seyssel and Metallic Lava Asphalte Company (Mr. H. Glenn), Office, 42, Poultry, E.C.—The best and cheapest materials for damp courses, railway arches, warehouse floors, flat roofs, stables, cow-sheds, and milk-rooms, graneries, tun-rooms, and terraces. [ADVT.

Asphalte.
Seyssel, Patent Metallic Lava, and White Asphaltes.
M. STODART & CO.,
Office:
No. 90, Cannon-street, E.C. [ADVT.

SPRAGUE & CO.,
PHOTOLITHOGRAPHERS,
22, Martin's-lane,
Cannon-street, E.C. [ADVT.

MICHELMORE & REAP,
Manufacturers of
CHARLES COLLINGE'S PATENT.
COLLINGE'S PATENT HINGES,
LEVER, SCREW, & BARREL BOLTS,
Self-Acting "FALL DOWN" GATE STOPS,
and IMPROVED GATE FITTINGS of every Description.
36A. BOROUGH ROAD,
PRICES REDUCED. LIST SENT ON APPLICATION. LONDON, S.E.

SHORT TIME CONTRACTS

Can be carried out easily by using our Lamps.

YOU CAN

WORK ALL NIGHT

AT MUCH LESS COST THAN BY GAS. ✣ NO STEAM OR AIR-PIPES REQUIRED.

Entirely Self-Contained. Portable. Very Cheap.

F. BRABY & CO., 352 TO 362, EUSTON ROAD, LONDON, N.W.

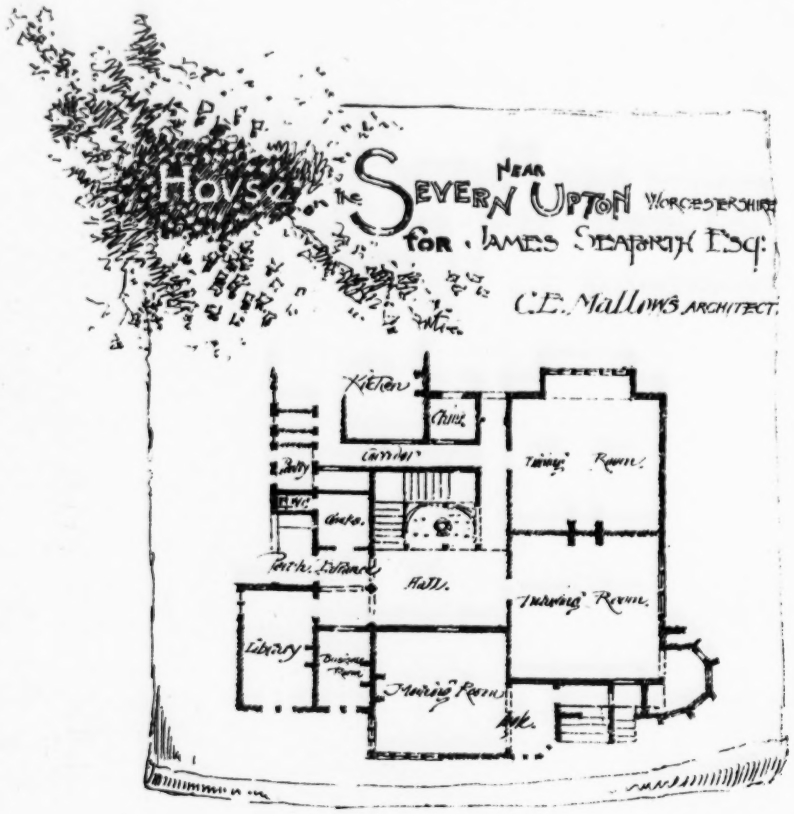

House
Near
the Severn Upton Worcestershire
for James Stapleton Esq.
C.E. Mallows Architect.
Kitchen
Corridor
Drawing Room
Hall.
Library
Morning Room

PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST. LONDON, E.C.

C.E.M. Lowis Del.
1895

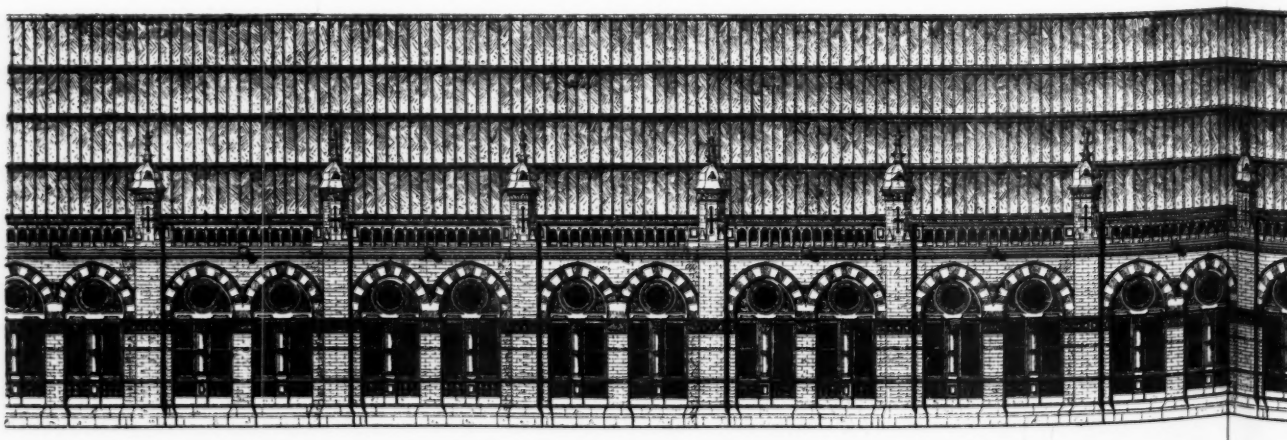
· GREAT · INDIAN · PENINSULAR · RAILWAY · VICTORIA · TERMINUS ·

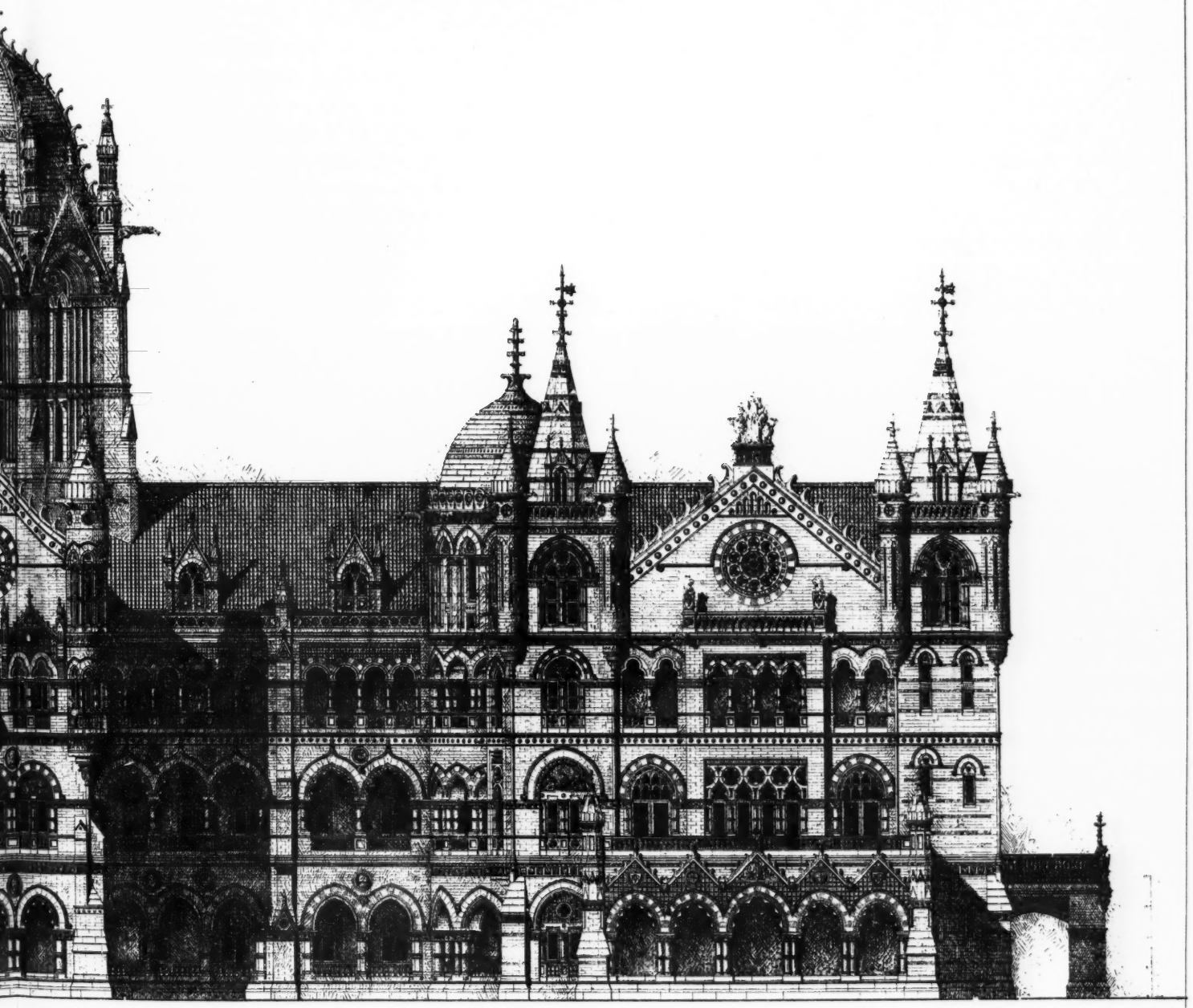
· AND · ADMINISTRATIVE · OFFICES · BOMBAY ·

A

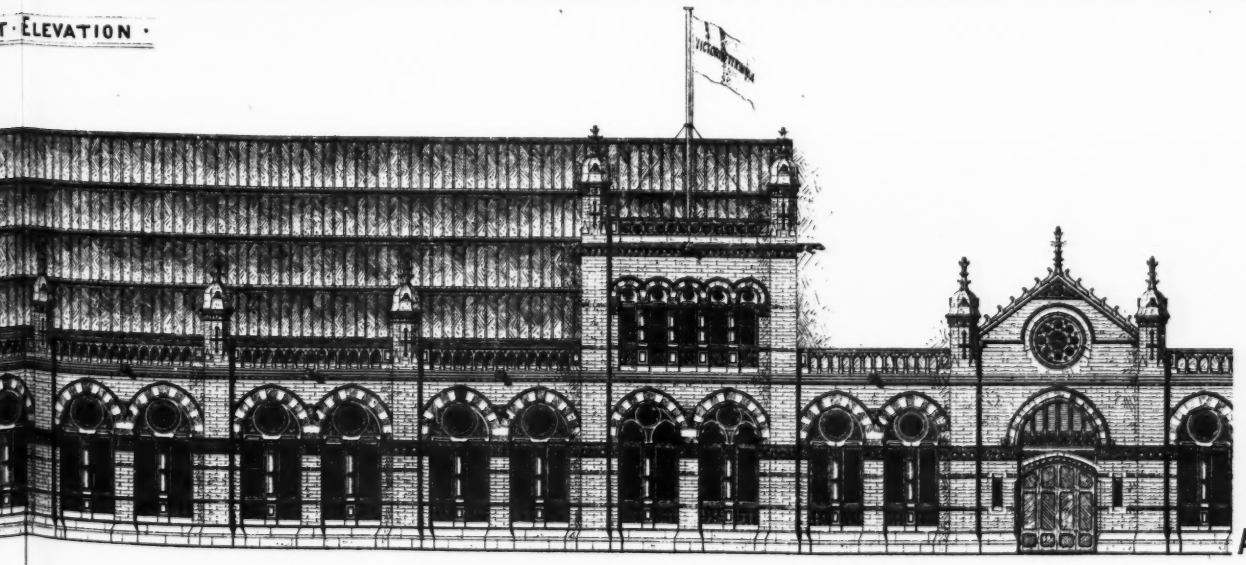
SCALE OF FEET

FRONT · OR · WEST · ELEVAT





T · ELEVATION ·



A

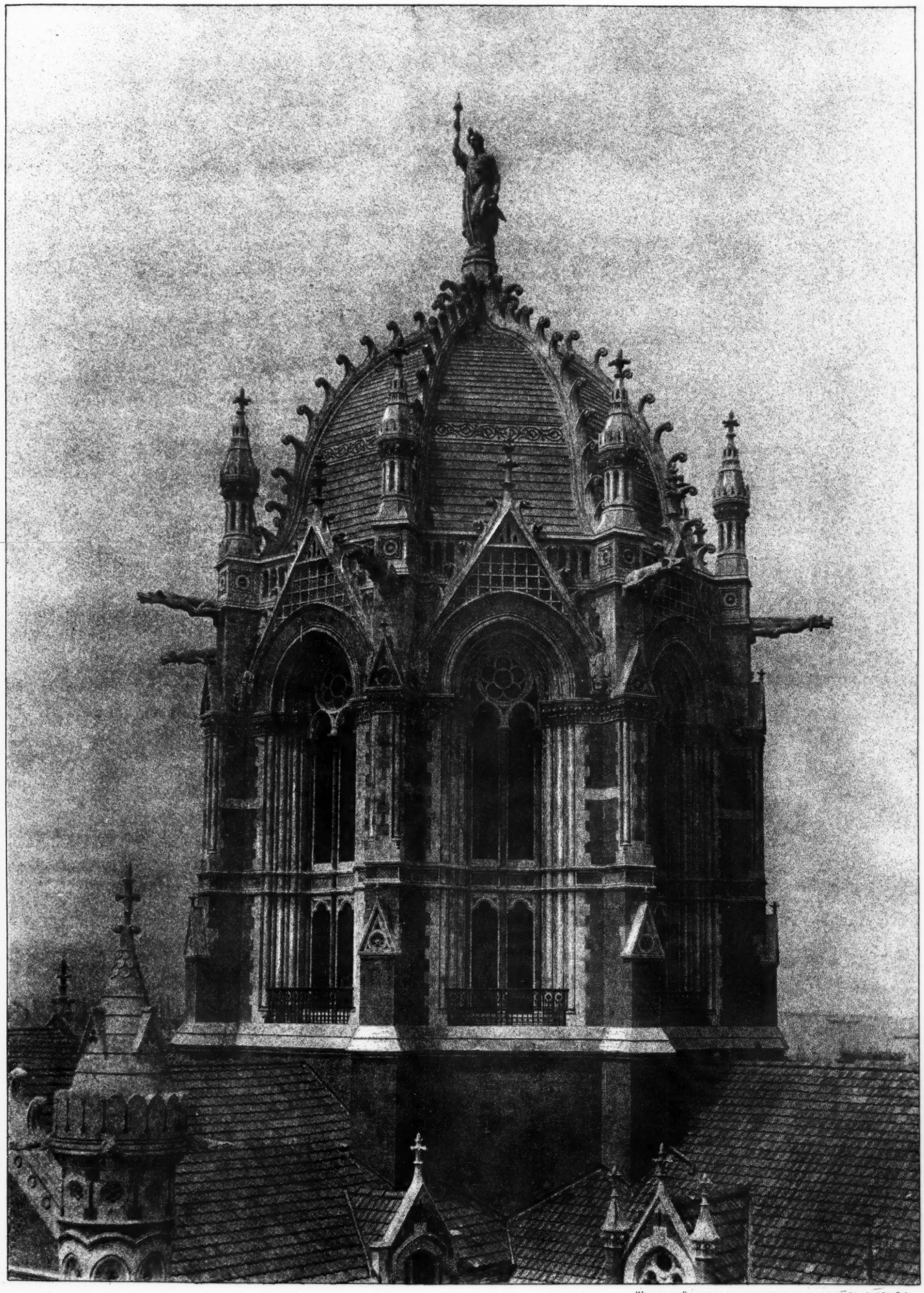
Fellow A.I.C.E.

PHOTO-LITHO. SPRAGUE & Co 22, MARTINS LANE, CANNON ST., LONDON, E.C.

"INK-PHOTO," SPRAGUE & Co. 22, MARTINS LANE, CANNON ST., LONDON, E.C.

INDIAN PENINSULAR RAILWAY TERMINAL BUILDINGS, BOMBAY.—Mr. F. W. Stevens, F.R.I.B.A., A.M.I.C.E., Architect.

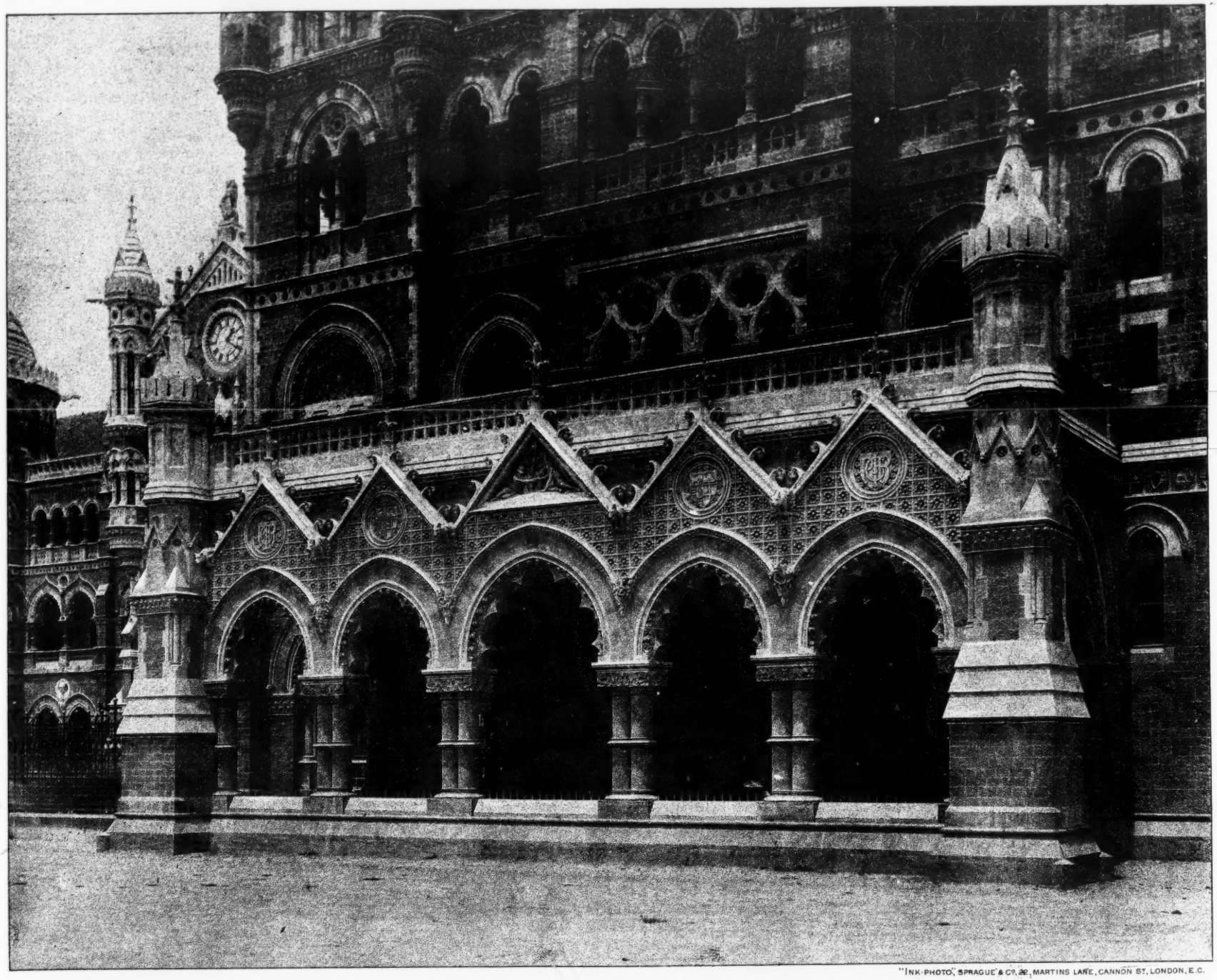
VIEW OF CENTRAL FEATURE.



"INK-PHOTO," SPRAGUE & Co, 22, MARTINS LANE, CANNON ST, LONDON, E.C.

INDIAN PENINSULAR RAILWAY TERMINAL BUILDINGS, BOMBAY.—MR. F. W. STEVENS, F.R.I.B.A., A.M.I.C.E., ARCHITECT.

PRINCIPAL DOME.



"INK-PHOTO," SPRAGUE & Co, 22, MARTINS LANE, CANNON ST, LONDON, E.C.

INDIAN PENINSULAR RAILWAY TERMINAL BUILDINGS, BOMBAY.—Mr. F. W. Stevens, F.R.I.B.A., A.M.I.C.E., Architect.

VIEW OF SOUTH WEST CARRIAGE PORCH.

"INK-PHOTO," SPRAGUE & Co, 22, MARTINS LANE, CANNON ST, LONDON, E.C.

INDIAN PENINSULAR RAILWAY TERMINAL BUILDINGS, BOMBAY.—Mr. F. W. Stevens, F.R.I.B.A., A.M.I.C.E., Architect.

VIEW OF ENTRANCE UNDER PRINCIPAL CARRIAGE PORCH.